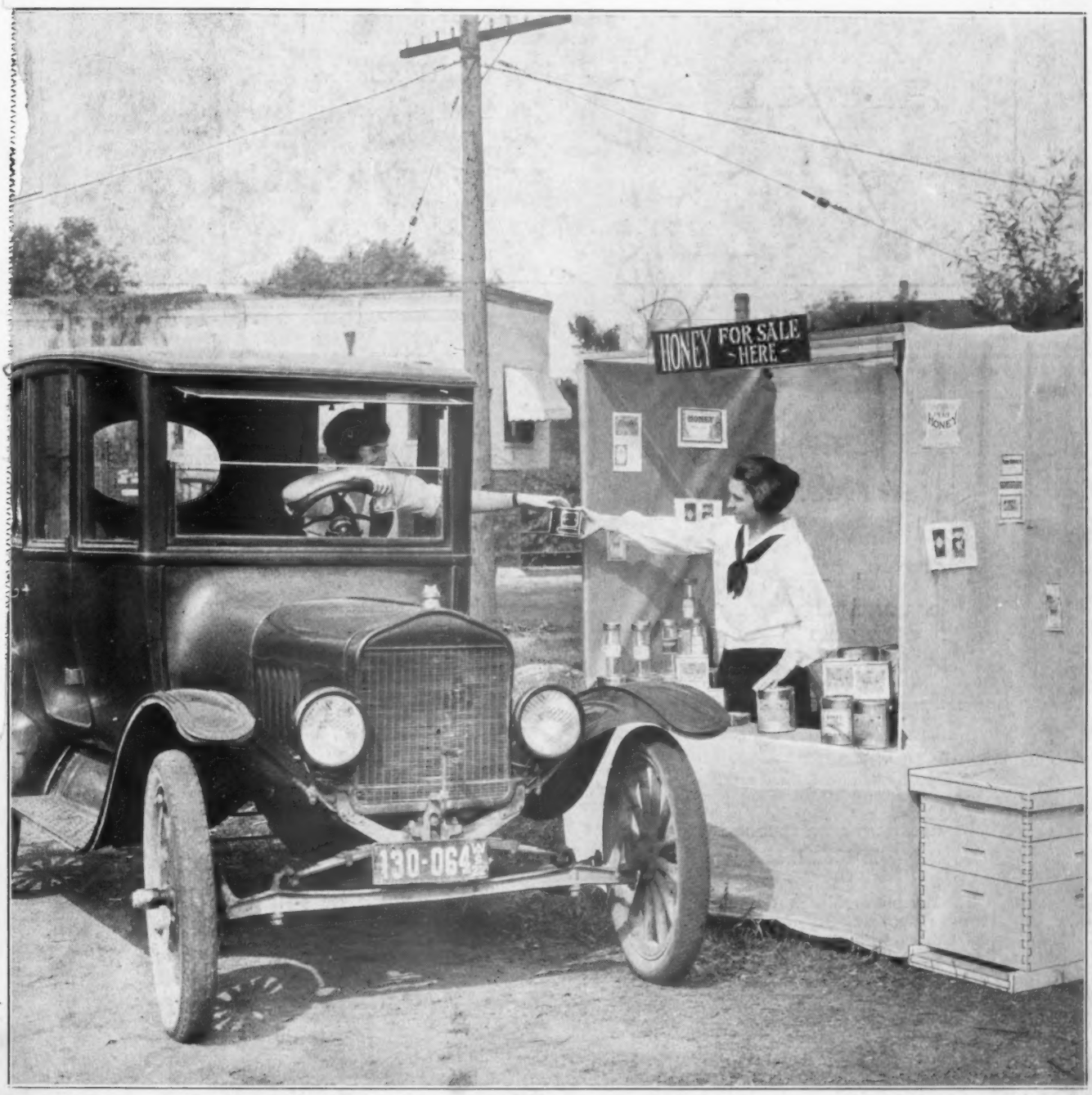
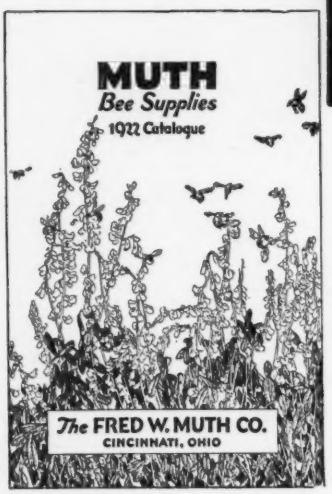
AMERICAN BEE JOURNAL

JANUARY 1923



ROADSIDE MARKETS ARE MOVING LARGE QUANTITIES OF HONEY DIRECT TO THE CONSUMER DURING THE SUMMER MONTHS



You need our 1922 bee supply catalog more than ever before. Have you received one? Many new articles are listed for the saving of labor and greater honey production. Our attractive prices, superior quality and prompt service will always be appreciated by beekeepers.

Send a list of your requirements

to us

THE FRED W. MUTH COMPANY

Pearl and Walnut Sts., Cincinnati, Ohio

THE DIAMOND MATCH CO.

(APIARY DEPT.)

MANUFACTURERS OF

Beekeepers' Supplies

CHICO, CAL., U. S. A.

Dadant's incomparable Foundation is always kept in stock. Western Beekeepers can be supplied advantageously.

EASTERN DISTRIBUTORS

HOFFMAN & HAUCK, 1331 Ocean Ave. WOODHAVEN, N. Y.

The Diamond Match Company requires responsible agents in the Central States who are in a position to handle car load lots.

BEEKEEPERS, wherever they may be located, before deciding where to obtain supplies, should write to the Diamond Match Co. for prices and for their Beekeepers' Supply Catalog.

This Company operates at Chico, California, the largest beehive factory in the world.

They own their own timberlands and sawmills, from the tree to the finished product; no middleman takes out a profit.

Full advantage of this low cost of production is given to the purchaser.

The Apiary Department (which is in charge of experienced supply men, who are also practical beekeepers) maintains a constant excellence of product and offers unsurpassed service.

ALUMINUM HONEYCOMBS

The Diamond Match Co. and their agents are the sole distributors in the United States of the Aluminum Honeycombs, manufactured by the Duffy-Diehl Co., Inc., of Pasadena, Calif. Write for descriptive pamphlets. Eastern beekeepers should send their orders for the Diamond Match Co.'s supplies to **Hoffman & Hauck, 1331 Ocean Avenue, Woodhaven, N. Y.**

DIAMOND MATCH CO., Apiary Department

CHICO, CALIFORNIA

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FOR REAL SUCCESS YOU SHOULD BUY

WOODMAN INNER OVERCOAT HIVES

Protected Bees Work Day and Night. It has been shown by careful observation that maintaining a temperature of 98 degrees permits comb building to go on **both day and night.** The bees will thus devote more daylight time to gathering honey.

Larger Honey Crops Are Assured. The bees are enabled to rear brood earlier in the spring, with no danger of chilled brood on account of cold snaps. One bee in March is worth one hundred in July. The early bees produce the early swarms, that get the large honey crops. Therein lies success or failure.

You will Practically Eliminate Winter Losses. With your colonies in normal condition (that is, with plenty of good stores, a young queen and young bees), you will be able to winter practically 100%.

The Inner Overcoat Hive will Last a Lifetime, as the outer hive walls are the same thickness as in the single-wall hive. In other words, **Woodman** Inner Overcoat Hives are **a lifetime investment—not an expense.**

Out-of-Door Wintered Bees Have Many Advantages over cellar-wintered bees. They do not spring-dwindle, and are stronger at the opening of honey flow.

Insures Close-up Protection. A person may have any amount of blankets fastened up to the wall of his room and still freeze to death if left in the center of the room without **close-up protection or insulation. The close-up protection in the Inner Overcoat Hive** is what does the trick.

Five one-story regular depth hives, $25; Jumbo depth, $27.50.

HOW TO USE
PROTECTION HIVES

When the bees are to be prepared for winter, remove the cleats which close up the insulating space. Then telescope one or more bottomless corrugated paper box insulators between inner and outer hive walls. Spread a piece of burlap or sacking material over the hive so that it will be carried down with the Inner Overcoats in telescoping them over the inner hive wall, having the effect of wrapping the brood nest in a blanket. These Inner Overcoats, with their air spaces, afford more protection than several inches of ordinary packing materials, and this is all secured in an insulating space of about one inch.

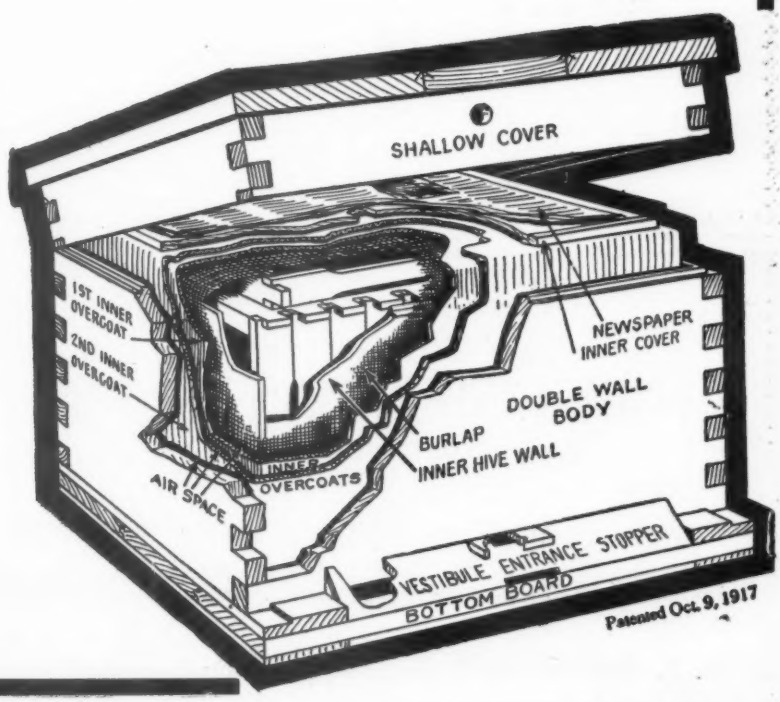
WOODMAN'S FAMOUS BEE-WARE

SPECIAL circular on Woodman's Protection Inner Overcoat, showing ten large illustrations, sent on request.

A. G. WOODMAN COMPANY
240 Scribner Ave. N. W.

SOLE MAKERS

GRAND RAPIDS, MICH.
U. S. A.



Big Reductions on Bee Supplies

Shipping cases, $30 per 100.
Slotted section holders, $3 per 100.
Sections, 1⅞, No. 1, $10 per 1,000.
Job lots of frames, regular size, $3 per 100.
Standard Hoffman frames, 9⅛ in. deep, $4.50 per 100.
Unspaced wedged top-bar frames, 9⅛ in. deep, $2.75 per 100.

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146 Newton Ave. N. and 159 Cedar Lake Road

MINNEAPOLIS, MINN.

WE'LL SUPPLY YOU

BEE SUPPLIES

THAT ARE REAL GOODS
AT RIGHT PRICES
IN RUSH ORDERS

FROM A. H. USCH & SON CO.
EEDSVILLE, WIS.

Let us quote you prices before you place your order. Illustrated Catalog sent on request.

PIONEERS OF 1892. PROGRESSIVE BEEKEEPERS OF 1922.

30 SUCCESSFUL YEARS

FOREHAND'S THREE BANDS

THE THRIFTY KIND

Thrifty Bees. Thrifty Queens.

A discount, a special offer, a guarantee that will protect; bees and queens that will make your investment a profitable one; service that pleases. Write us now and let us explain how you can increase profits for 1923.

W. J. FOREHAND & SONS, Fort Deposit, Ala.

CONTENTS OF THIS NUMBER

Special Rates to League Convention ---------- 5
Queen Laying in Queen Cell --- 9
Soils and the Honey Flora—John H. Lovell ---------- 11
Milkweed Pollen—O. A. Stevens- 13
Editorials ----------14-15
Pollens Gathered by Bees—R. L. Parker ---------- 16
Package Bees in the North—J. T. Floyd ---------- 19
Our Future Honey Producers—E. W. Atkins ---------- 20
Honey from Soy Beans—Frank C. Pellett ---------- 20
Does Beekeeping Pay?—Arthur C. Miller ---------- 21
Solar Wax Extractor—W. J. Sheppard ---------- 22
The Huber Letters ----------23
My Pet Bees—William Reynolds- 23
Queen Breeding on the Cotswold Hills—A. H. Bowen---------- 24
Memory of Location in Queens—Dr. H. von Buttel-Reepen ------ 25
Remarks on Queen Breeding—John Protheroe ---------- 27
Hubam Clover ---------- 28
Queen Bee Registry—C. H. Smith 28
Introducing Queens—A. N. Draper ---------- 28
Introducing Queens—W. H. Lewis 29
Wild Bees as Pollenators—O. A. Stevens ---------- 29
New Yorker Comes Home—G. H. Cale ---------- 31
Feeding to Prevent Robbing—C. P. Dadant ---------- 31
Marketing Honey—S. W. Dyer--- 31
Crystallized Civilization—A. A. Evans ---------- 33
Price Specials on Honey—John T. Bartlett ---------- 33
Pollination of Fruit Blossoms--- 34
Editor's Answers ----------34-35
Odds and Ends ---------- 36
Miscellany ------- 6, 39, 44, 45, 46
Will Alfalfa Weevil Ruin Bee Industry?—Dan B. Whelan----- 37
25,000 Members for League—H. B. Wilson ---------- 38
Crop and Market ---------- 43

YORK'S BEES and HONEY

GEO. W. YORK, Editor.
906 W. First Ave., Spokane, Wash.
A 16-page monthly, at $1 a year—devoted exclusively to bee culture. It's different from the other bee-papers. Better order it for a year, beginning with the January number. You'll like it. Sample copy free.

MONEY AND SATISFACTION FOR YOU

Save one profit by buying direct from factory. Standard, Jumbo and Modified Dadant Hives; cedar or pine. Write for catalog.

A. E. Burdick Co., Sunnyside, Wash.

SPECIAL RATES TO LEAGUE CONVENTION

The railroads are offering special rates of one and one-half fare to the St. Louis convention of the American Honey Producers' League, February 6-8, 1923, conditioned on an attendance of 250. At the time the ticket to St. Louis is secured the purchaser must ask for a **certificate.** The purchase dates will be February 2 to 8. Certificates are to be turned in to the Secretary of the League, and if 250 are received they will be validated, entitling the holder to secure a return ticket at half price.

One of the big events of the convention will be the discussion on honey grading and standardization, led by Dr. E. F. Phillips, Washington, D. C., and A. C. Rauchfuss, Denver, Colo. Standard grades and colors for the entire United States are to be established by the U. S. Department of Agriculture in the near future and all interested in this question should be present. The fixing of these grades will be one of the most important events in the history of beekeeping for all future sales of honey in the United States will be based on the grades and colors established as standard.

Dr. Phillips tells us that the display of honey samples he will bring to the convention makes the best honey exhibit he has ever seen.

The Secretary writes that the supply of honey booklets is still holding out. Beekeepers may secure them by writing the Secretary of the League at the Capitol Annex, Madison, Wis.

Big Price Paid for Strawberry Plant

According to newspaper reports, Mr. Frank E. Beatty, of the R. M. Kellogg Co., Three Rivers, Mich, large strawberry plant growers, has paid $50,000 for a single strawberry plant to a grower in Iowa. This plant is of the everbearing variety and produces not only in the spring when the usual strawberries are producing, but late in the fall as well.

The unusual price paid was partly to encourage growers to develop new strains of strawberry plants.

WHO PAYS THE FREIGHT?

When you buy a beehive or a box of foundation, do you ever figure the freight?

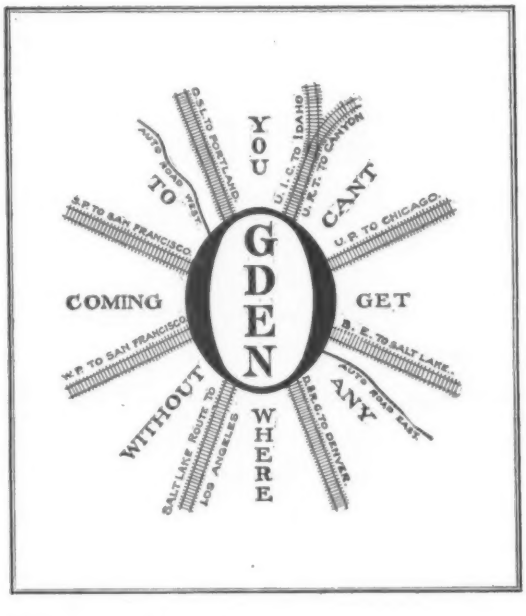
It is not Necessary to Pay High Freight Rates

The clear, soft white pine timber, from which SUPERIOR dovetailed beehives are made, grows nearer to us than to any other American manufacturer and is purchased by us direct from the saw mills.

The western beeswax, from which virtually 100 per cent of SUPERIOR foundation is made, is acknowledged to be more desirable for foundation than wax from other regions on account of its superior color and texture.

We operate a strictly modern bee and supply factory, centrally located, with six railroad lines at our (for your) service.

HOW MUCH FREIGHT



DO YOU PAY?

SUPERIOR HONEY CO., Ogden, Utah

Manufacturers of Beekeepers' Supplies

Branches at Idaho Falls, Idaho, and Riverside, Calif.

Victorian Beekeepers Advertising Honey

The Victorian Beekeepers' Association, with headquarters at Melbourne, Australia, is attempting an advertising campaign. A modified campaign is being carried on in the papers, giving dietic value of honey. In conenction with this, a honey book, copy of which we have just received, is being offered. This book contains 22 pages and has considerable information on the value of honey and a large number of honey recipes. As contrasted to most honey booklets it contains quite a lot of advertising which helps pave the way for the booklet. These are distributed in single copies at about 6c each, or about 3c in lots.

The Association suggests that all members contribute one per cent of the value of their crop to the advertising campaign or send honey in equal amount, which will be disposed of.

Sugar Honey

We have on our desk three jars of sugar honey which is a mixture of invert sugar and honey put out by the Franklin Sugar Refining Co., at Philadelphia. The jars are of 11 oz. size and the liquid appears about the color of an extra light amber honey, with a rather light body. The mixture has a good honey odor and tastes considerably like honey. The taste would lead one to believe that a rather strong, cheap honey was used as a mixture with the invert sugar. It sells, of course, in direct competition with honey, and at a considerably lower price.

Hon-e-nut Candy

We are in receipt from one of our good subscribers, Mr. D. C. Gilham, of the Fairmount Apiaries, Schuylkill Haven, Pa., of a one-pound package of hon-e-nut candy. The candy was attractively put up in a nice candy box with print of straw skep and other illustrative material.

These candies are all chocolate coated, some of them containing comb honey and some a mixture of honey and peanut butter.

The pound package is sent to any address on receipt of $1 to cover cost and postage.

Mr. Gilham informs us that attempts have several times been made to patent hon-e-nut butter and hon-e-nut candy, but that it is impossible to do so. It would, of course, be possible to patent the processes under which such material is made. Mr. Gilham has been engaged in the manufacture of these mixtures of peanut butter and honey and the making of honey candy for a number of years.

How Much for Honey?

A recent number of "Science" states that in 1921 the people of the United States spent ten dollars per person for candy, nine dollars for education, fifty cents for chewing gum, and twenty-nine cents for health.

If the average American spends more for candy than for the education of his children he certainly has an appetite for sweets which will consume an unlimited amount of honey if the beekeeper's product is brought to his attention.

A Good Showing

The report of the Provincial Demonstration Apiaries of British Columbia for 1922 has reached the editor's desk. The smallest per colony average in any of the demonstration apiaries was 75 pounds, and 532 pounds per colony the highest. The average per colony for all the demonstration apiaries was 232 pounds. One 1-pound package gave a surplus of 75 pounds. It is evident that British Columbia is good beekeeping territory and also evident that the inspectors in charge of the demonstration apiaries know how to keep bees.

It is interesting to note that the estimated crop for the Province averaged 61 pounds per colony and that the average wholesale price is 25 cents per pound.

Arizona Fair

The display of Arizona apiary products at the 1922 State Fair was the largest and most attractive ever exhibited in the state. However, it could and should be made much larger and more representative of the industry in Arizona, which is valued at more than half a million dollars. The exhibits from five counties were very creditable, when one considers the distance and cost of transportation. Competition was keen in the extracted honey classes. Mr. B. S. Paterson, of Phoenix, won the sweepstakes prize for the best exhibit of honeybees, wax and apiary tools. Mr. Nathan Hucklebee, of Yuma, won first prize on his exhibit of Italian bees and queen, pronounced by many beekeepers as the most uniform colony of Italian bees they had ever seen. Mr. S. M. Campbell, of Flagstaff, had the unique exhibit, a log beehive showing how our father used to keep his bees fifty years ago, and a modern hive and winter case showing how it is done now. Dr. Chas. T. Vorhies, of the University of Arizona, judged the exhibit.

The Season's Greetings—

WHY—WHEN—WHERE

WHY—You should get your name on our mailing list; it means service to you throughout the year of 1923.

WHEN—Now is the time; a post card with your name and address will bring our Bee Supply Catalog to you.

WHERE—Service in every sense of the word is yours.

AUGUST LOTZ COMPANY, Boyd, Wisconsin

BEES Bred for Honey Gathering **QUEENS**

My bees are **Moore-Howe** strain, bred from select mothers chosen from my 1,000 colonies with special reference to honey-gathering, white capping, uniformity of color and gentleness.

First premiums for the last five years at fairs in my section on queens and nuclei.

Prices for April and May:

3-frame nucleus with untested Italian queen ---------- $5.00

1 untested queen, $1, 25 or more, 90c each.

Tested queens, $1.50 each; 25 or more, $1.40 each.

I guarantee a square deal.

JOHN W. CASH, Bogart, Ga.

A SUPERIOR QUALITY AT LESS COST

SUPPLIES

A SUPERIOR QUALITY AT LESS COST

(MADE BY THE DIAMOND MATCH CO.)

To Our Beekeeper Friends:

We have recently written to our manufacturers—The Diamond Match Co.—requesting them to use every endeavor to try to make a further reduction in supply prices for 1923, maintaining, of course, the high standard of quality. They state this is an impossibility, in fact, 1923 prices will be about 5% higher.

We are submitting to our beekeeper friends a letter received from them.

November 29, 1922.

Hoffman & Hauck, Inc.,

1331 Ocean Ave ., Woodhaven, N. Y.

Gentlemen:

We note that the beekeepers complain to you as to the cost of supplies. If they complain about your prices, we wonder what they say to---------- and to ----------, as your prices are, we believe, 25 per cent below theirs. It might be advisable to explain to the beekeepers who complain, that the price of hives, etc., is governed solely by the value of lumber, and that you are supplying them with beehives at lower prices than they can buy lumber of the same quality, and if they will take the trouble to ascertain the cost of sugar pine lumber and the footage, including waste, in a beehive, that they will be more than satisfied with what you are doing for them.

Yours faithfully,

THE DIAMOND MATCH CO.

The Good News:

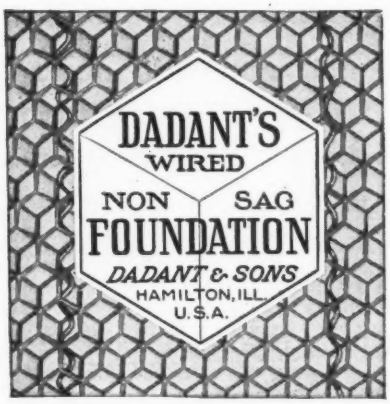
The Diamond people have, however, accepted specifications from us for three carloads supplies at 1922 prices. We have already sold about one carload, but there are two left. We will accept orders in January 1923 at our 1922 catalog prices, **less 10%** discount as long as these two cars hold out.

Yours for Health and Happiness.

HOFFMAN & HAUCK, Inc., Woodhaven, N. Y.

YOU WILL USE

Reinforced with Radiating Shoulders of Strength



Makes Non-Sag All-Worker Comb.

Patented.

IF YOU FIGURE YOUR COSTS

DADANT'S WIRED FOUNDATION

Eliminates sagging, giving greater brood area
Reduces the following items of expense:—
Hand Wiring, Drone Comb, Breakage in Extracting

DADANT'S WIRED FOUNDATION is best used in split or slotted bottom-bar frames, but it is also adaptable to one-piece bottom-bar frames or to any style of brood or extracting frame.

ASK FOR SAMPLE. A free mailing sample will be sent free on request. **SPECIAL OFFER.** A sample of seven sheets, for either split bottom-bar or old style one-piece bottom-bar frames will be sent, postpaid, to any address in the United States for $1. Specify size desired. Only one sample to a person.

BEESWAX. We need large quantities of beeswax and are paying good prices now. Ship to us at Hamilton, Ill., or Keokuk, Iowa., or drop us a card and we will quote f. o. b. here or f. o. b. your own station, as you desire.

WIRED FOUNDATION IS SOLD BY ALL DISTRIBUTORS OF LEWIS "'BEE WARE" AND DADANT'S FOUNDATION.

SEND THEM YOUR ORDERS.

DADANT & SONS, HAMILTON, ILLINOIS

Catalog and Prices on Foundation, Bee Supplies, Beeswax, Wax Working into Comb Foundation and Comb Rendering for the Asking

Queen Laying in Queen Cell

Out of the fund of your experience and familiarity with beekeeping literature I am going to ask you a question. Did anyone ever report positively having seen a queen lay in a queen cell? It seems to me that somewhere I have seen some such report. Probably in a magazine article, although the authorities I have been able to look up are inclined to doubt it. I myself also doubt it. How do eggs get in queen cells, then? We see queen cell cups empty and the next day there are eggs in them. Do the bees always, in such cases, transfer the eggs? Unquestionably we know that they do sometimes, but my question is whether or not this is **always** true. Sometimes, of course, they build the cells around eggs or larvæ, but I am not sure that any real authority has ever reported having actually seen the queen lay in the queen cells. If you find any such references I would thank you to give me the name of the authority and page where I can find it.

Texas.

Huber (edition of 1814, pages 244-5,) reports positively having seen a queen lay in a queen cell. Although the English translations extant are much abridged, this statement is found in them (pages 146-7, edition of 1821). He wrote: "We also found her (the queen) this day laying in a royal cell; she first dislodged the worker there employed, by pushing her away with her head, then, after having examined the bottom, she introduced her belly into it, by supporting herself with her anterior legs on one of the adjoining cells." He says, also, however, that the queen cell in which the queen laid was only "two-and-a-half lines deep", or about one-fifth inch deep.

He also states (pages 302-3, French edition of 1814) that the old queen "never attacks those cells when there is only an egg or a very young worm in them; but begins to fear them when the worm is about to transform into a nymph, or when it has already undergone this transformation." Further (note of page 317) "that the queen lays in queen cells when they are but outlined, when they fairly resemble the cup of an acorn." This appears to give color to the statement made by Langstroth and Chas. Dadant (paragraph 106 of the "Hive and Honeybee), that "Such is a queen's instinctive hatred of her own kind, that it seems improbable that she should be intrusted with even the initiatory steps for securing a race of successors." When she lays in those rudiments of queen cells, she does not realize that she is preparing a rival. It is only when the cell has assumed what Huber calls "the inverted pyramid shape" that the queen objects to the rearing of rivals, not realizing that she has begun this work herself.

Other people besides Huber have answered that question in the affirmative. So it appears well established that queens do lay in queen cells when they are only in rudimental form; just as they lay in rudimental worker cells, but we do not believe anyone has ever known them to lay in rudimental drone cells.

As Huber was not acquainted with the facts of parthenogenesis, he was very much puzzled by the fact that queens never laid worker eggs in drone cells, unless the mouth of the cells had been reduced. He was also much puzzled by the fact that queens whose impregnation had been delayed beyond 21 or more days, or queens which had failed to mate, laid only drone eggs. Parthenogenesis would have been of great help to him.—C. P. D.

Honey in the Newspapers

One of our subscribers, Mr. W. H. Evans, has sent us heading of the Wilkes-Barre Times Leader, a daily paper, which has in its heading a straw skep. In the issue of October 11 of this paper appeared a very nice editorial on honey. It is surprisingly accurate, in view of the many misstatements which have been appearing in the past in the press of the country.

In fact, we believe that there has been, in the last year or two, a decided improvement in the quality of material used by the newspapers of the country. They seem to be getting desirable and reliable information on bees and honey for their readers.

PACKAGE BEES FOR 1923

Three-band Italians only bred for business. A 2-pound package of the MOSES hustlers with a select untested Queen, $3.75, 25 to 100 packages $3.50; 10 per cent books your order. Safe arrival and satisfaction GUARANTEED ON EVERY PACKAGE AND QUEEN SHIPPED.

Order now for spring delivery, and make sure of shipping date. I do not accept more orders than I can fill promptly.

W. H. MOSES, Lane City, Texas, U. S. A.

MONEY SAVED

BEE SUPPLIES

TIME SAVED

Roots goods at factory prices with WEBER'S Service

Send us a list of your wants and we will quote prices that will save you money

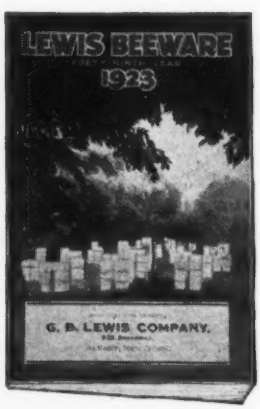
C. H. W. WEBER & CO., 2163-65-67 Central Ave., Cincinnati, O.

49 YEARS FOR PROGRESS IN BEEKEEPING—*No. 1*

Constructive Policies *Behind Lewis Beeware—*

FOR 49 years the G. B. Lewis Company has given its best to the development of the beekeeping industry in North America. Our reward is that we now offer the most complete line of practical beekeeping supplies carried by any manufacturer in the world.

Our policy has been to support the best interests of the honey industry in a broad and constructive way. We have always accepted the responsibility of supplying to beekeepers the latest improved equipment and methods, while protecting them by distributing only that equipment which has been proved out in practical use.



THE new catalog lists many distinctive improvements in supplies that will interest every practical beekeeper. Sent anywhere in North America on request.

The Lewis Beeware catalog for 1923 is not only the most complete and up-to-date book of its kind but the most reliable. The equipment it offers embodies improvements requiring the investment of many thousands of dollars in elaborate special machinery—costs us more to make—*but in every instance is the best buy* the beekeeper can make, results considered.

LEWIS BEEWARE

G. B. LEWIS COMPANY

Home Office and Works—Watertown, Wisconsin, U. S. A.

BRANCHES—ALBANY, N. Y. LYNCHBURG, VA. MEMPHIS, TENN. WICHITA, KAN.
OVER 200 DEALERS THROUGHOUT THE U. S. A.

AMERICAN BEE JOURNAL

VOL. LXIII—NO. 1 HAMILTON, ILL., JANUARY, 1923 MONTHLY, $1.50 A YEAR

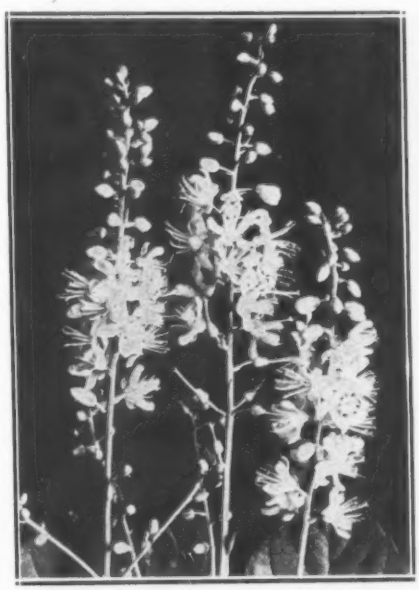
SOILS AND THE HONEY FLORA OF THE UNITED STATES

By John H. Lovell

WHAT is a soil? What is the origin of soils? How do they differ? What is the effect of different soils on the distribution of vegetation? It is clearly necessary to know something about soils before we consider their influence on the distribution of the honey plants and the secretion of nectar. It can but excite surprise that they have received so little attention in our bee magazines and books on bee culture. Here and there, indeed, a beekeeper has recognized the importance of a knowledge of soils in the locality near his apiaries. Thus a beekeeper in one of the Southern States writes that he makes use of soil maps in selecting locations for beekeeping. It would be well if every beekeeper did the same. Certainly every beekeeper should be familiar with the soil survey of the county in which he lives, if one has been made. Take New York, for instance, the southern portion of the state is poor in lime, but is well adapted to the growing of buckwheat. North of this section there is a limestone belt which extends from Buffalo nearly to the Hudson River, on which the clovers thrive and secrete nectar abundantly. Other limestone areas are in Jefferson, St. Lawrence and Franklin Counties in the northern part of the state, where large crops of clover honey are obtained. It is of great practical interest for beekeepers to know the limits of these areas. A bee yard on the margin of one of these limestone tracts might store a large surplus, while another yard ten miles distant on a non-calcareous soil might give very poor results. On the acid sandy soils of the Adirondack region it would be useless to look for clover, and raspberry is the most important honey plant. A beekeeper should be familiar with the soils of his locality as well as with the honey plants.

The Bureau of Soils

The Bureau of Soils at Washington is engaged in a soil survey of the United States. Up to June 30, 1919, the total area covered by detailed surveys amounted to 517,949 square miles, or 331,487,360 acres. A portion of every state in the Union has been surveyed and mapped. In all about 35 per cent of the United States east of the Rocky Mountains has been mapped in more or less detail, and a broad general knowledge of the soils acquired. The soils are classified entirely according to their present characters, without reference to their geological, topographical, climatic or vegetable characters.



Sweet pepperbush is found at its best on acid soils.

The soil surveys of counties are usually published separately, and a list of those available may be obtained by addressing the Superintendent of Documents, Washington, D. C. The price varies from 15 to 25 cents each. The surveys of certain years are bound in book form, the price of which ranges from $2 to $11. As an illustration, let us take the soil survey of Schoharie County, New York. The report consists of 31 pages, and gives a brief description of the area, climate, agriculture, and of 18 types of soil. A large colored map shows the distribution of the different soils. The larger part of the 398,000 acres in this county is covered with soils derived from sandstones and shales, and is not at all calcareous. But in the northern part of the county there are 25,000 acres which are rich in lime, and there are as many more acres with soils slightly or moderately calcareous. These areas are clearly shown by the map. The soil rich in lime, or the Honeoye loam, is the best soil in the county and produces large crops of clover and alfalfa, but it is irregularly distributed and could not be easily located without the map. That the soil survey of this county is of great value to both beekeepers and farmers is self-evident.

The Relation of Soils to Nectar Secretion

In England, says Sladen, sainfoin yields the largest amount of honey, and the best seed in regions where the subsoil is chalk. Buckwheat is reported to yield nectar better in a sandy soil, and Phacelia on a clay soil. White clover and sweet clover give the largest surplus

on a soil rich in lime, while gallberry and the blueberries grow only on acid soils. Marigold in Texas succeeds best on the black prairies, and is absent from sandy or gravelly ridges. Spikeweed covers thousands of acres of the alkaline plains of the upper San Joaquin, Calif., where it yields honey by the carload. Many other examples of the influences of soil on honey plants will be given in this paper, but at this point the above are sufficient, since it is not questioned that soils are closely related to the distribution of honey plants and the surplus of honey.

It would seem as though most observers believed that the soils directly acted on the nectaries, but this is not the fact. There is no evidence that any chemical stimulates nectar secretion, but is is well established that vigorous plants will yield more nectar than stunted, poorly developed individuals. Kenoyer found by experiment that vigorous buckwheat plants yielded about twice as much nectar as did weak ones in the same bed. According to Hunter, alfalfa yields the greatest amount of nectar under conditions which give the most vigorous growth. In the Rainy River district Sladen states that an old and fast deteriorating stand of fireweed yielded little nectar, but vigorous plants on moist burned-over clay ground in Ontario secreted nectar copiously. When raspberry bushes grow in northern Michigan on the burned-over barrens—'dreary, desolate, blackened tracts"—they are short and stunted and of little value as honey producers, says Hutchinson. But on land from which the magnificent hardwood forest has been lumbered the raspberry grows luxuriantly and "is simply incomparable as a honey producer." In Florida the scrub palmetto on the margins of hammocks, where the soil is damp and rich attains its largest size and yields the greatest amount of nectar.

This result is indeed wholly in accord with expectation. Sugar is believed to be the first staple product formed by plants in making their food—probably glucose. The larger and more vigorous the plant the more sugar it must make. Such a plant would be likely to secrete more nectar than a stunted plant of the same species. For example, under the conditions of Alpine heights, plants make more sugar than in the lowlands, as is shown by the presence of a greater quantity of red color, a pigment which requires sugar for its formation, and they also yield a larger amount of nectar. For the manufacture of sugar by leaves a suitable temperature is required. If it is too low or too high, and the optimum or best temperature varies with different plants, the making of sugar is checked or stopped. Thus the soil affects nectar secretion as it checks or promotes a more vigorous growth of plant. If the soil is suitable, and also soil water and temperature, a honey plant may usually be expected to secrete freely, but a failure in any one of these factors may cause negative results. There are also minor factors, which may be important.

Phacelia tanacetifolia yields more nectar on clay than sandy soils.

The Relation of Rainfall and Temperature to Soil

But while the kind of soil, or its chemical composition, exerts a great influence on the growth and distribution of plants, rainfall and temperature are two factors, which must always receive consideration in any discussion of the soils. If there is no water in the soil the region is a desert, and if too much water, a swamp. Between these two extremes all degrees of soil water occur. Strictly speaking the water in the soil is a part of the soil, and by some investigators is regarded as more important than the material of the soil. Gola, an Italian writer, considers the water in the soil, or the soil solution, as more important than the composition of the soils, and he classifies plant habitats in four groups based upon the quantity of water in the soil, viz.: water plants, marsh plants, plants living in average soils, and plants living in dry or arid soils. That the surplus of honey is often in many regions dependent on rainfall is well established; the sages in California and the clovers in the prairie region may fail to yield nectar if the season is very dry.

Temperature is likewise of far-reaching importance. White clover in southern Wisconsin and southeastern Minnesota is a very reliable honey plant, but in the warmer climate of Tennessee even on limestone soils, the crop is very uncertain. In northern Michigan it fails to secrete nectar at low temperature when raspberry and willow herb are yielding well. A sudden drop in temperature has often brought the harvest of honey from buckwheat to an abrupt close. In all discussions of the influence of soils on nectar secretion, rainfall and temperature must receive due consideration.

Sladen gives a most interesting example in England showing the dependence of nectar secretion on cli-

Sainfoin is a lime soil honey plant.

mate, even when the soil is suitable. In this country heather, which is an acid soil plant, requires, in order to yield well, not only a peaty surface soil but a suitable subsoil. In one region near the coast a whinstone subsoil is considered of no value for honey, although the heather grows well and flowers profusely on it. The bees are accordingly sent to the more distant moors, which have a granite subsoil. But in the west, where the climate is milder and more moist, a whinstone subsoil gives excellent results. The same observer states that alfalfa never yields nectar in England, and that in 20 years he never had a good crop of honey from white clover on the southeast coast.

It is even more strikingly shown that nectar secretion may be independent of the soil, in the case of honey plants which bloom several times during the season, but fail to yield nectar during one or more periods of blooming. Giant sainfoin in England, according to Sladen, blooms first about June 10, and yields a crop of honey if the weather has been suitable. It blooms again in July, yielding the main honey crop. There is a third period of bloom in middle August, when it yields no honey. In the San Joaquin Valley, Calif., there are four crops of alfalfa. The first and last crops yield little if any honey, but the second and third, says Richter, if proper climatic conditions prevail, give a great abundance of nectar. A plant may make a fairly good growth on an unsuitable soil, the bad effects of which may appear only in the flowers and fruit, as will be illustrated under the soils of the Western States.

The Soils of the United States

It is impossible in this paper even very briefly to review the soil provinces of the United States and their types of soils. A moderate-sized volume would be required. The soils of the Southern States and the crops for which they are adapted will be found sufficiently described in "Soils and Agriculture of the Southern States," by H. H. Bennett, a book of 499 pages, with a colored map showing the distribution of soils in this section. It is impossible to over-rate such information. "The natural character of the soil and its present condition form one of the fundamental facts with which every farmer and **every person concerned with agricultural production must deal.** It underlies every problem of business, educational and social improvement, because these are inseparably connected with the dollar." (Cornell Extension Bulletin 15.) For the purpose of this paper three general types or groups of soils which cover vast areas will be considered: The lime or calcareous soils, the acid soils, and the injurious alkali soils.

(Editor's Note: This is the first of two articles by Mr. Lovell dealing with soils and honey plants. The next will appear in our February issue).

Maine.

MILKWEED POLLEN AGAIN

I was interested in the note in the November number of the Journal, entitled "Milkweed Pollen." This brought to my mind a couple of notes which I had made in Kansas several years ago.

On **Asclepias incarnata** I noted the bees seemed to have considerable trouble in extricating their feet from the flower. I did not observe that they were actually unable to free themselves, but each time seemed to require a distinct effort to get away from the blossoms. On **Asclepias sullivantii,** I noted six dead bees on about a couple of dozen flower clusters and five more bees which had all of their feet entangled and apparently unable to get away. This seemed to indicate that the latter species might be an offender of some importance, although I believe it is not especially a common species.

O. A. Stevens.

North Dakota.

Highbush blueberry is a honey plant which thrives on acid soils.

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THE EDITORS' VIEWPOINTS

GOOD WISHES

A letter from Mrs. C. C. Miller and Miss Wilson, of Marengo, Ill., expresses appreciation of the Miller Memorial Library and also desires to extend to the readers of this Journal their best wishes for a Happy New Year.

We might add here that the entire staff of this Journal wish to convey similar sentiments to our readers.

AN INTERESTING BOOK

We have before us the third revised edition of "Entomology, with Special Reference to its Ecological Aspects," by Dr. J. W. Folsom, of the University of Illinois.

Although containing a number of scientific terms, the book is intended for the general reader as well as for the student, and proves quite interesting to any one who likes the study of insects.

Concerning the senses of insects, the author suggests that which has already been said by others, that touch, taste, smell, hearing and sight differ remarkably in range from our own, and that our own experiences of these senses are inadequate to appreciate those of insects. This is a much more rational view, we think, than to assert, as some scientists have done, that because, for instance, we are unable to locate the ears of bees they have no perception of sounds. It is the same with sight, which differs from ours, but is probably greater in the direction of their needs. Folsom says that insects are extremely sensitive to variations of wind, temperature, moisture, and atmospheric pressure, and we know that to be true, in bees at least.

A very interesting chapter of this work is that which treats of the light and heat on coloration of insects. Probably the bright colors of the Italian and Cyprian bees are due to the climate of the countries they inhabit.

Although this work contains but a few pages devoted to bees and their anatomy and habits, it will prove of value to the studious apiarist.

DOES BEEKEEPING PAY?

Does farming pay? Does poultry raising pay? Does an orchard pay? We have plenty of answers to the question: does beekeeping pay? and yet there is nothing definite to conclude from those answers. Why? Let me tell a little of my old-time experience.

We began to manufacture comb foundation in 1878. We sold only a few hundred pounds. Our principal business was honey production, of course. In 1879, we sold about 2,000 pounds of foundation, and towards the end of the season I attended a meeting of beekeepers where two other foundation makers were present, for foundation makers were quite numerous at that time. Most beekeepers tried it.

We had a very inquisitive and wide-awake beekeeper at that meeting. His name was E. D. Godfrey, of Red Oak, Ia. He was constantly investigating the pros and cons of everything. He came to me at the end of the meeting and said: "I have enquired, today, of three foundation makers, whether comb foundation making pays; one of them answered that it does, the others that it does not pay." I was the one who answered that it paid, and was somewhat astonished that the other two did not think it paid. Well, they proved that it did not pay, by quitting the making of foundation within 3 or 4 years.

It is the same with the production of honey. Some make it pay well, and continue, and increase their business from year to year. Some others are indifferent; they keep bees because they like bees and enjoy the production of honey. Others still find no profit in it and no pleasure, and they quit.

What is the cause of all these differences? Aptitude; location; opportunity; earnestness; economy, etc.

The man who keeps bees without liking bees, who hires his work done by others, who is afraid of stings, who hastens to get rid of his honey as soon as it is harvested, in the fear that he cannot sell it, cannot succeed. Beekeeping doesn't pay.

The man who goes into keeping bees because some friend of his succeeds, but does not investigate locality, quality of colonies, proper methods, cannot succeed, except accidentally. Beekeeping doesn't pay.

The man who buys bees without knowing anything about beekeeping and expects to get all the information he needs out of the few questions he asks, cannot succeed. Many a man shows, by asking the most elementary questions, that he has never read anything about bees and does not know the first principles of beekeeping. Beekeeping doesn't pay.

I never could succeed in making potato growing profitable; yet there is doubtless a lot of money made in growing potatoes. But I never had any trouble in making beekeeping pay.

SELLING HONEY

The quantity of honey produced in the United States in a single season is estimated all the way from one hundred to two hundred and fifty million pounds. We ought to be able to estimate it a little closer, if our Census Bureau used a little more ingenuity in seeking the facts. But the Census people have taken it for granted, without sufficient enquiry, that the bees are all on the farms. So the Census takes no account whatever of bees, or honey produced. within the limits of incorporated cities or villages. Probably nearly half of the amount of honey produced in the United States is thus ignored by the Census.

But even if we estimate the amount of honey produced at the highest guess, it only represents about 2½ pounds of honey per capita of population, in a country which is said to consume now over 80 pounds of sweets per capita.

Can we say that there is too much honey produced? No, that is not the trouble. Some of our friends write that the people are not educated to eat honey. Is there any need of education, when the children are told over and over that nothing is better than honey? What, then, is lacking? Confidence in the honey which is sold. Many people would buy honey without hesitancy, if they were sure that it is pure. But the silly stories about manufactured comb honey, about adulterated honey, about honey "going back to sugar," are sufficient to deter many from buying honey at all.

Educate the people, yes; educate them especially in the knowledge that there is no such thing as manufactured comb honey; in the fact that granulation is a condition of pure honey in cold weather; that the best honey granulates and may be melted easily. Don't let a lady purchaser get away from you with the statement that she has no use for honey when it "goes to sugar." She thinks she knows; it is your business to prove to her that she is only guessing.

When we secure confidence from the entire nation, when we get them to realize that our honey is pure, that granulatd honey is exactly as nature made it and that it may be liquefied without trouble; when we take out of the minds of the people the imaginary assertions of manufactured honey, we will not have half enough for the consumption of our sugar-loving nation.

THE CHAIRMAN'S GAVEL
A LITTLE HISTORY

At the National meeting of beekeepers of 1905, a very kindly demonstration of sentiment was shown by the gift made to both the National Association and the Northwestern, of silver mounted chairman's gavels, made from

a tree which had been planted years before by Mr. Langstroth's own hands.

The gift was made by Mrs. J. J. Glessner, of Chicago, through Dr. C. C. Miller who, in a neat speech, presented the National gavel to the then National President, C. P. Dadant, and the Northwestern gavel to G. W. York, its president. The manner in which the wood of the Langstroth tree had been obtained was described at length in the account of the proceedings, American Bee Journal, July 12, 1906, page 599.

This pretty incident has been very nearly forgotten. The National gavel is astray in the hands of one of the several presidents who served as chairman of the National and who has probably forgotten all about it. The Northwestern gavel was brought to Chicago by its former president, E. S. Miller, at the last meeting, and it was decided to present it to the Miller Memorial Library.

We suggest that the former president who detains the National gavel should send it also to the Miller Memorial Library.

DONATIONS TO THE MILLER MEMORIAL FUND

As mentioned in our October number, the editor addressed letters to some 200 authors and editors of books and bee magazines in the world, in three languages—English, French and German. We are happy to say that the responses are numerous and the books and magazines arrive at Madison in such numbers that Professor Wilson declares he is unable to classify them as fast as they come. This library will surely become the most complete bee library in the world, for even old works are being received from enthusiastic beekeepers.

HONEY IN AUTOMOBILE RADIATORS

In our December issue, page 540, we published a few words from R. B. Willson, of Ithaca, N. Y., concerning the use of honey in automobile radiators, to prevent freezing.

Since that time we have received the two following letters upon the subject:

"We note in last issue that you call for reports on the use of honey in auto radiators. Eight years ago we purchased our Ford, and for three winters we have used honey as an anti-freezing mixture; we, however, did not keep tab on the ratio of the mixture, but simply made the water good and sweet, then tested it out by placing a cupful outdoors on a cold night; if it remained soft and "cheesy," as we called it, O. K. Low grade honey would be the logical kind to use, and as this sometimes varies somewhat, a hard and fast rule would hardly be safe; then, too, the farther north or colder the weather, the richer the mixture ought to be; a 1 to 3 mixture, in our estimation, would be rather rich; we consider the honey much cheaper and more reliable than alcohol, as there is no danger of evaporation; however, at the end of the season, or when there is no more danger of freezing, the radiator should be drained, filled with fresh water, a little soda added, machine run for say ten miles, then filled again with fresh water. In this way no harm will have been done the radiator. We have used the same radiator eight years and it is perfectly good yet.

"H. G. Quirin, Bellevue, Ohio."

"We noticed an article in American Bee Journal this month relative to the use of honey in the radiator of cars in cold weather to keep them from freezing. We used a mixture of honey and water in a Ford all last winter, making the mixture half honey and half water, which worked out very satisfactorily. I hope this matter may be given more publicity, as it will help the business, and it is also one of the best and most economical mixtures to be had. Very truly yours,

"Lyke & Eldredge, Sharon Springs, N. Y."

We have also made some experiments, but up to date have not had weather as cold as the coldest of the Central States, so cannot say anything definite for the coldest weather. Here is a tabulation of what we did:

We began the test with one pound of honey in a 10-pound pail filled with water. At 26 deg. F. it was still liquid. At 21 deg. it became mushy. At 18 deg. it had about an inch of frozen liquid all around the inside, so we did not carry the experiment farther with 1 pound of honey to a 10-pound pail of water.

Two pounds of honey in a 10-pound pail remained liquid at 21 deg. At 19 deg. it showed some ice on the edges of the pail, but was still safe.

Three pounds of honey in a 10-pound pail of water did not show any ice at 18 deg. Then the thermometer dropped to 2 deg., and the mixture froze almost solid.

A mixture of half and half showed no ice at all at 21 deg., none at 18 deg., and a mushy condition at 2 deg. below zero.

So half-and-half, honey and water, will surely stand zero weather without damaging the radiator, but may freeze at lower temperatures. We will continue the experiments.

We found it important that the honey and water be well mixed. So we put the honey with more water than needed and reduce it to the proper point by boiling. A careless mixture might give opportunity for the honey and water to separate, the honey going to the bottom and the water freezing at the top. It should be reduced to a sort of syrup which will not separate.

We would suggest that a little alcohol added to a solution of this kind would probably prevent freezing entirely. The great trouble with anti-freezing mixtures containing nothing but alcohol and water is that the alcohol is the first to evaporate, and that when the radiator needs refilling, more alcohol has to be added. With honey there is no chance of evaporation of anything but the water, and a very little syrup needs to be added at each refilling.

Gleanings in Bee Culture, in its December number, gives experiments made in the refrigerator of an ice cream company, showing that clover honey, half honey half water, froze solid at 10 deg. above zero. As our experiment showed only a mushy condition at 2 deg. below, we judge that there may be some difference in the grade of the honey, but we are rather inclined to believe that it is the better mixing of the honey by heating which made the difference. So we urge our beekeepers to put more water than needed in the mixture and evaporate it to the proper degree by boiling. It will have the additional advantage of destroying any germs of foulbrood that might exist in inferior honey used, in case the honey was spilled on the ground in spring.

The Gleanings man is using two-thirds honey and one-third water and it does not freeze at 12 deg. below zero.

Some objections are raised by the suggestion that a rich mixture in a Ford may retard the circulation and cause the engine to heat. Also that a rich mixture may cause granulation and accumulation of crystals in the pipes. We do not think either of these objections will prevail, if the mixture is well heated and reduced, preparatory to using. There is very little danger of granulation then.

We urge our readers to make additional experiments. By keeping a pail of honey water exposed to the weather they can always ascertain whether the mixture in their auto will stand the cold. If it proves too thin, draw it out and boil it down.

A universal consumption of honey in automobile radiators in this country would use millions of pounds of inferior honey and would greatly increase the demand for this commodity. We propose to continue the tests, and ask for reports from all directions.

The question of whether a thick liquid, like mushy honey water, partly frozen, but soft under the fingers, would possibly retard the free circulation of the liquid, has been raised by some automobile owners. But an expert machinist assures us that glycerine, used in radiators, has the same tendency to become thick, and yet serves the purpose well; the only trouble being that it is too expensive. More tests will be needed to settle these matters positively. We are looking for further testimonials this winter.

SOME POLLENS GATHERED BY BEES

By R. L. Parker

IN the summer of 1921 pollen was gathered quite extensively for the purpose of gaining information concerning the various plants visited by honeybees for this substance and also for a microscopical study of pollen. The botanist studies pollen in the dry state or moistened with water, but in this work this pollen was gathered from the bees and not from the flowers, and therefore the data gathered concerning the plants that the bees work on is positive. As a check, pollen from flowers was examined at various times in honey. There were no variances.

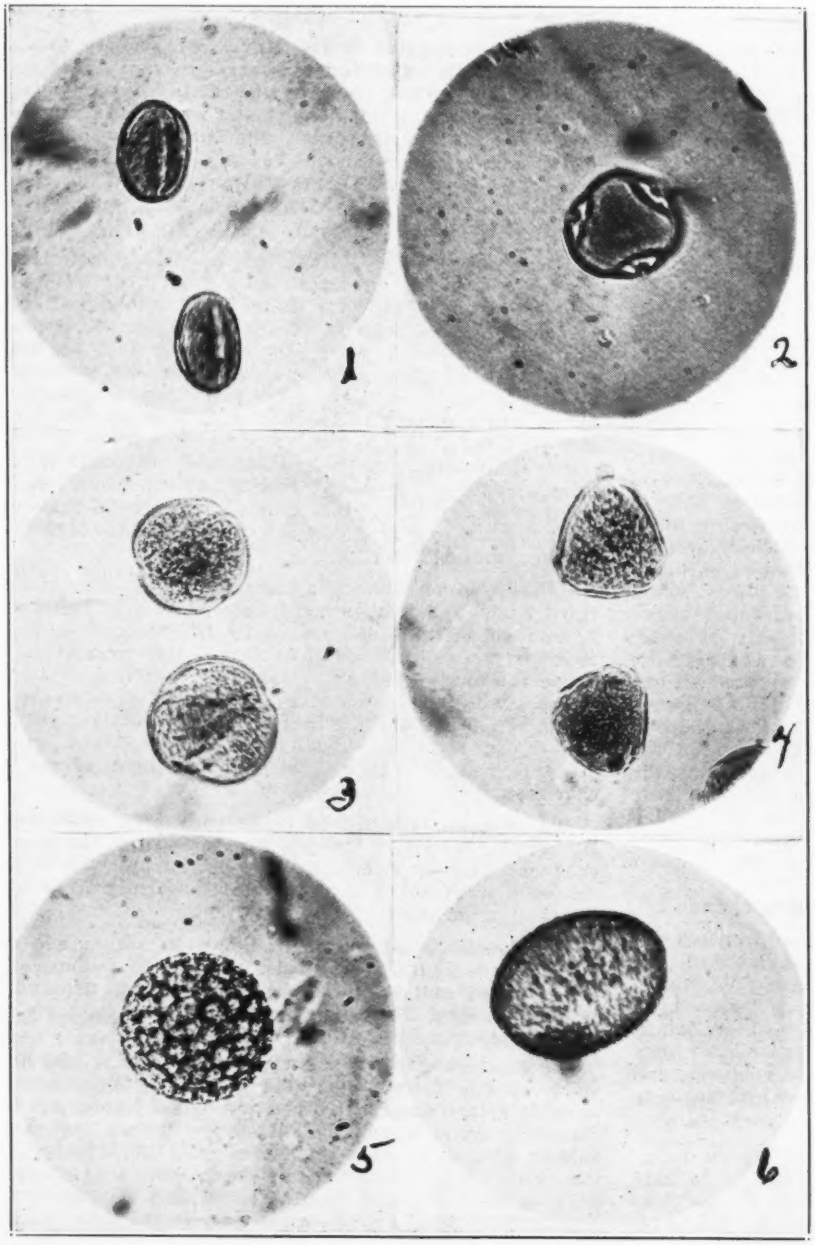
Other Works

A general search through apiculture literature revealed very little concerning the morphology or measurement of pollen grains. Browne and Young's work, "Chemical Analysis and Composition of American Honeys," is without doubt the most comprehensive. They give descriptions of various types of pollen with measurements, analytical key and photographs.

The botanical literature gives a little information. Kerner and Oliver is the outstanding reference, giving numerous measurements, descriptions and drawings. Many of the pollens described are not common to the United States. Kerner states that, in general, pollen grains are ellipsoidal, as in the geranium and opuntia, or spherical as in the cucurbits and hemp. The next most common form is angular or crystalline. The pollen grains of nasturtium are three-sided prisms. The dandelion has many crystalline forms which occur within the same anther.

Many grains have grooves or striations.

The spherical and ellipsoidal grains have grooves running like meridian lines with two distinguishable poles. "The number of grooves are constant for a given species, and even for whole families of plants." The single furrow is an outstanding characteristic of the pollen grains of the tulip tree and grasses; on some species of Amaryllis two furrows are characteristic. The pollen grains of a large number of plants have three grooves, as in the violets, roses, beeches, oaks, willows, Solanaceae and Composites. Four grooves occur in some labiates and six in most labiates. Many have a conspicuous sculpturing of their walls, sometimes in the form of dotting. Sometimes the whole surface is dotted over with sharp, needle-like prickles as in the Composites, Cucurbitaceae, Malvaceae, Amaryllis, Canna and Lonicera. The pollen grain wall is three layered, and it is the superficial or outer layer which shows the sculpturings and projections. The inner layer abutting upon the protoplasm of the cell is homogeneous.



Pollen grains greatly magnified. 1. White clover. 2. Basswood. 3. Maple. 4. Apple. 5. Heartsease. (*P. pennsylvanicum*). 6. Buckwheat.

Methods of Technique

The pollen for this work was obtained by catching bees that were gathering pollen from specific plants, in the locality of Ames, Iowa. It was noticed that from some flowers the bees gathered only pollen, from others only nectar, and in others they may collect both nectar and pollen. Many times there may be an abundant supply of pollen with the nectar. They will brush over the anthers to seek the sweetness and be covered with pollen. Bees have also been observed arriving at the hive in this condition without having packed the pollen which is distributed on the body hairs. Again, as on the Tartarian honeysuckle **(Lonicera tatarica L.)** and white clover, bees were observed to be divided in their duties. Some would be collecting only pollen while others would alight and dip into the flowers, disregarding the pollen. Others were observed to collect both nectar and pollen but were evidently seeking nectar and incidentally collecting pollen. The pollen masses in the latter case were rather less than half a load.

When a bee approaches a small flower, as the lilac **(Syringa vulgaris L.)** it does this from above. Little if any pollen is gathered by the bee and then only by the mouth parts. Here the insect is primarily seeking nectar.

The honeybee collects only one kind of pollen when out on a trip. Aristotle observed bees in pollen-gathering, and states that the bee confines herself to the kind of blossom on which she begins, even if it is not so abundant as some others. A load of pollen taken from the corbicula is found to be of a uniform color throughout. The colors brought in by various bees may be yellow, orange, red, brown or green. Sladen

states that **Bombus terrestris** brought in white pollen. He also states that **B. terrestris** brings in mixed colors of pollen in different strata, but does not state anything concerning the honeybee. The bumblebee may gather one or several pollens on a trip, depending upon the abundance of any one kind. This has also been observed by the writer at different times.

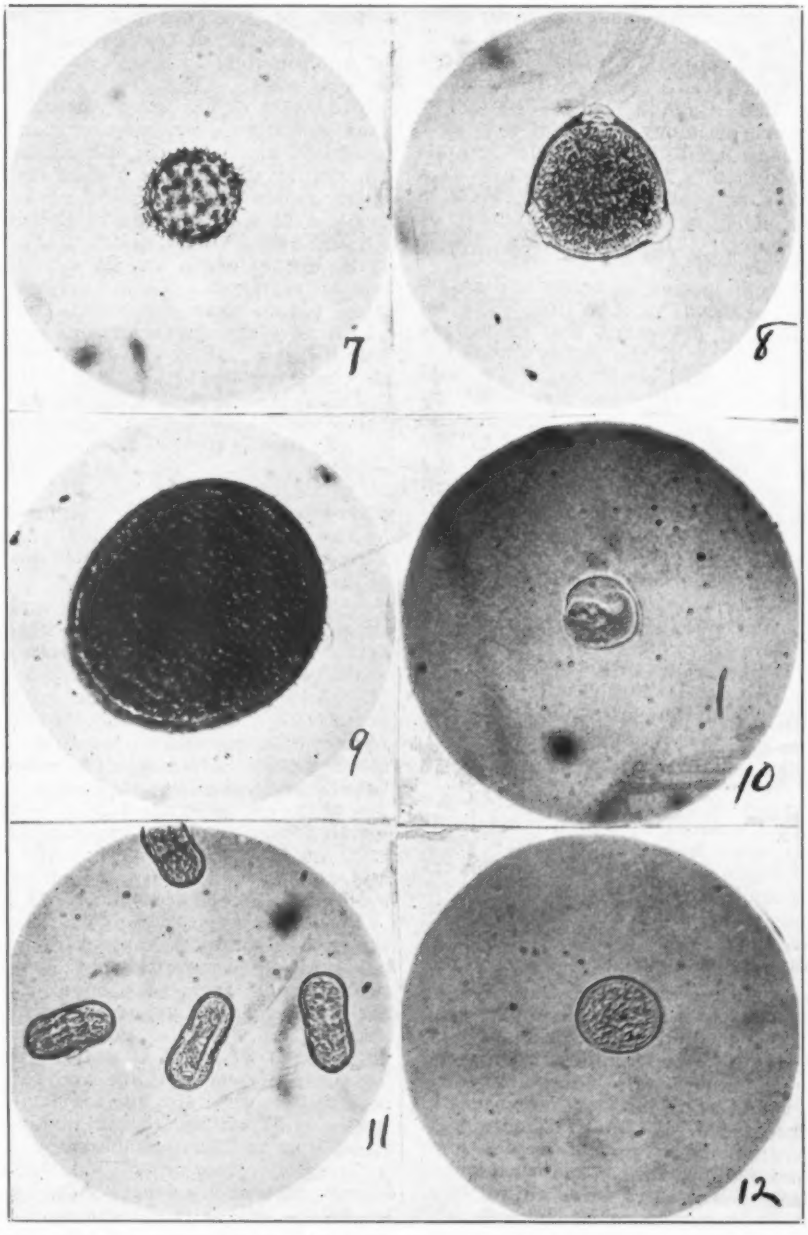
During the spring of 1922, pollens of two different colors were collected from bees at various times from **Acer negundo, A. nigrum** and **Lonicera tatarica.** The colors of these pollens were yellow and green in all cases. But upon drying only one color was persistent. Pollen gathered by bees at various times, during the blooming period of these plants, showed different colors as **A. negundo,** yellow-green and green; **A. nigra,** yellow and green-yellow; and **L. tatarica,** yellow and green. A microscopical examination proved that these respective pollens were pure.

Different sizes of pollen would not pack together as well as all of one kind, and for this reason the bee probably prefers to gather pollen from only one species of plant at a time. Corn pollen, for instance, is about three times larger than that of the honeysuckle and about five to six times larger than that of the willow. Perhaps the bee is constant to one species of flower because the flower odor is the guiding factor. Frisch states that odor no doubt helps to attract, as does also the color of the flower. Bees have a faculty of fixing these tangible things so that they can return to them. It is akin to memory in the human. Chas. Darwin, Sir John Lubbock, Kerner and Sprengel have discussed the sense of color and agree with Frisch. Huber states that, "Not only do bees have a very acute sense of smell, but they add to this faculty the remembrance of sensations—and that unpleasant odors quickly excite their anger."

Several bees, observed in 1921 gathering pollen on white snakeroot **(Eupatorium urticaefolium),** which had many aster plants scattered among them, would at times accidentally alight on an aster and they reacted as if they had come in contact with something hot Others later working on the aster reacted in a similar manner towards the blossoms of white snakeroot. This behavior was observed for several days. Again, in the spring of 1922, bees working on Tartarian honeysuckle in a mixed planting of this and **Spiraea Van Houttei,** reacted in the same way. The bees would be blown into the spiraea by the wind and then they would scramble off and seek the honeysuckle flower. Sometimes they would fly onto the spiraea, hardly touching it before they were away again, as if it were distasteful to them. Other instances were observed in June, 1922. In mixed planting of mock orange **(Philadelphus coronarius L.)** and ninebark **(Physocarpus opulifolius Maxim)** bees sought one plant only. At one time they were working the mock orange and at another time the ninebark. When the yellow clover began to blossom bees were blown from it to dandelion and immediately sought the clover.

This, I think, is proof that the honeybee collects pollen from only one species of plant at a time. It was observed in 1921 and also in 1922 that bees do not bring in pollen masses of various colors, as a general rule, and when different it is in the shades or tints of the same color. Cheshire makes this statement about the constancy of the honeybee in pollen collecting: "This act being favoured by the curious habit of the **Apidae** of visiting one kind of flower only, during any single excursion—a habit for which no sufficient explanation can be given—." Edwardes also mentions the fact that the pollen brought in by a bee is entirely from a single species of flower.

After killing the honeybees in cyanide bottles the pollen masses were dropped into a vial and covered with a little honey in order to prevent moulding and distortion of the grains. Morley states that in the literature of Greece reference is made to the fact that honey was used as an embalming agent or preservative. "The power possessed by honey of preserving organic bodies immersed in it was well known to the ancients——." Browne and Young tried preserving pollen in a solution of glycerin without much success. Every beekeeper has seen pollen stored in cells of a comb, and if he has tasted it he knows that honey is mixed with it. Stored in this way it keeps for a long period. With all the heat, moisture, food and the crawling of bees over these packed cells it is a wonder that the masses do not become mouldy from the contact of spores carried on the



Pollen grains greatly magnified. 7. Wild sunflower. 8. Muskmelon. 9. Corn. 10. Asparagus. 11. Hollyhock. 12. Plantain.

legs of the bees. Very seldom is mouldy pollen seen in the hive.

In this work honey was used to preserve the pollens gathered. Many of the pollens have been kept in corked vials for a year and no deterioration has taken place. All examinations of pollen grains in other works, except that of Browne and Young, have been done in the dry or moist state. Microscopical examinations for this work have been made with the pollen in honey. At the present time , June 24, 1922, there have been preserved sixty-five different kinds of pollen. This paper deals with only twenty-eight of these.

The examination of pollen grains in many cases is only temporary. Some standard is necessary to compare them with. A method of making permanent mounts of pollen was therefore sought. Three methods were tried and two were successful. As mentioned above, honey was used to preserve the pollen. Young had used glycerine to seal the cover glass in the same way honey was used. Honey exposed in small quantities hardens after a time and is transparent like Canada balsam. Another feature of honey is that it acts as a clearing agent for the pollen grains. The difficulty with using honey as a means of sealing the cover glass is that moisture affects the viscosity of the honey. This method was therefore discarded.

A combination of honey and an asphalt seal was next in line. The asphalt seal prevented any change in the viscosity of the honey under adverse moisture conditions.. The last method to be tried was a combination of honey and Canada balsam. At first there was a doubt as to the water content of the pollen and honey affecting the xylol in the balsam by clouding. The honey used was sweet clover over a year old. As honey ages, evaporation takes place and the water content was thereupon low. The honey had also been heated several times to prevent granulation, and this drove off water. When tried in combination with balsam there were no deleterious results.

The technique of slide manufacture was rather simple as compared to other histological work for making permanent mounts. A small drop of honey was put upon a slide, then a minute amount of pollen was evenly distributed in the honey, after which this mixture of honey and pollen was surrounded by balsam and the cover glass mounted in the usual manner. The slides were dried for three or four days at about 50 degrees C.

Examination of Pollen Gathered by Bees

This preliminary work includes twelve different families, twenty-one genera and twenty-eight species. Classified as to shapes there are six: ellipsoidal, with eight falling in this group; spherical, seven; ovoidal, one; subtriangular, three; spherical-spiculated, seven; and crystalline, two. The examinations, measurements and photographs of pollen were all done with honey as the mounting medium. Photographs were taken of eleven different families, and in one family two species, or in all twelve microphotographs.

Pollen of different plants more or less closely related is often found to be very similar or even identical in appearance, and it is frequently impossible to carry the identification as far as the species. The various pollens will be mentioned as types and for convenience will be named after the family or genus represented. The descriptive data are given according to the order of importance in this locality.

Leguminous type. The typical shape is ellipsoidal when seen from the side with three openings arranged at equal intervals around the equator, and usually indicated by rather large protuberances. The grains have a thin, smooth wall, light colored, with finely granular cytoplasm.

Pollen grains of white clover are typical of this group. The size varies from 28 mu (mu equals 1-1000 of a millimeter) in length and 23 mu in diameter. (Fig. 1). That of white sweet clover is very similar to that of white clover, ranging from 27 mu to 30 mu in length and 22 mu to 23 mu in diameter. Yellow sweet clover pollen in length is 30 mu to 33 mu and 23 mu to 25 mu in diameter. Annual sweet clover pollen is 27 mu to 30 mu in length and 20 mu to 23 mu in diameter. White clover is more plump than the sweet clovers which have the appearance of a flattened ellipse. Red clover is similar to white, but larger .

Tiliaceous type. The pollen of basswood or linden **(Tilia americana)** is very distinctive. This one has the appearance of a truncated triangle inscribed within a circle. The three pollen tube openings are subtended by the clear spaces between the lobes The diameter ranges from 37 mu to 40 mu (Fig. 2).

Aceraceous type. The typical shape is a three-lobed figure with one of the lobes protruding from the other two. Pollen grains of hard maple **(Acer nigra)** are typical of this group (Fig. 3) measuring 45 mu to 48 mu in length and 43 mu to 47 mu in diameter. Soft maple **(A. rubrum L.)** is very similar, as is also the box elder **(A. negundo L.)** The former is 28 mu to 40 mu and the latter is 32 mu to 37 mu in length, while the diameter of the former is 37 mu to 38 mu and the latter is 28 mu to 33 mu.

Rosaceous type. In this family there is no definite shape of the pollen grains. Generally they have a subtriangular form with openings at the corners which are covered with a shallow cap. Apple pollen has a diameter of 37 mu to 40 mu (Fig. 4). Rose is elliptical in shape and varies in size for different species **R. hiawatha** is 37 mu to 43 mu in length and 23 mu to 27 mu in diameter.

Caprifoliaceous type. This family has the subtended triangle-shaped pollen grains with a slight cap over the angles. The Indian currant **(Symphoricarpos orbiculatus Moench)** has a length of 37 mu to 40 mu and is 28 mu to 37 mu in diameter.

Polygonaceous type. In this family there are two types of pollen grains, smartweed **(Polygonum pennsylvanicum L.)** is spherical with sculpturing on the surface. Its diameter ranges from 52 mu to 62 mu (Fig. 5). Buckwheat **(Fagopyrum esculentum Moench)** is ellipsoidal with two longitudinal grooves and is 47 mu to 68 mu in length and 37 mu to 50 mu in diameter. (Fig. 6).

Composite type. The pollen of this family is very similar. It is usually rather small, spherical and covered with spines. Sunflower **(Helianthus annuus L.)** is thickly covered with short, sharp spines. The diameter of these grains is 33 mu to 37 mu (Fig. 1). Dandelion is 33 mu to 37 mu in diameter and crystalline in form. Giant ragweed **(Ambrosia trifida L.)** is 18 mu to 20 mu in diameter; the spines are here reduced to rounded knobs. Coneflower or golden glow **(Rudbeckia laciniata L.)** has a diameter of 25 mu to 27 mu and white snakeroot **(Eupatorium urticaefolium Richard)** is 20 mu to 23 mu. Goldenrod **(Solidago rigida L.)** is a crystalline form measuring 27 mu to 40 mu in diameter. Blue aster **(Aster sagittifolius Wedemeyer)**, is a small spiculated sphere with a diameter of 20 mu to 23 mu, and common thistle **(Cirsium lanceolatum** Hill) is 43 mu to 53 mu.

Curcurbitaceous type. This group has various forms, the two types represented here are the spherical with many spines, as the crookneck squash **(Curcurbita Pepo L.)** having the large size of 130 mu to 150 mu in diameter and the subtriangular as the muskmelon **(Cucumis melo L))** which has rather a thick wall and a coarse, granular cytoplasm (Fig. 8). It is 47 mu to 60 mu in diameter.

Graminous or Grass type. This is represented here by a large grain, the corn **(Zea Mays L.)** which has a thick wall and very coarse granular contents. It is ovoidal in shape and is 83 mu to 107 mu in length and is 78 mu to 90 mu in diameter. (Fig. 9).

Liliaceous type. Asparagus **(Asparagus officinale L.)** is spherical with a large protuberance at one side. It has rather a thin wall with fine granular contents. The pollen grains are 25 mu to 30 mu in diameter. (Fig. 10).

Malvaceous type. The hollyhock **(Althaea rosea Cav.)** (not typical of this group but the only one which happened to be collected) is ellipsoidal with an indentation on each side from which arise two protuberances. It is 27 mu to 37 mu in length and 17 mu in diameter (Fig. 11).

Plantain type. The common plantain **(Plantago major L.)** is a spherical pollen grain with a heavy wall and coarse granular contents. It is 27 mu to 30 mu in diameter (Fig. 12). This is not commonly gathered by bees, but may be, in time of a dearth of pollen.

Value to Apiculture

Bees gather various pollens for

food. We know a few of the plants that the bees utilize for this purpose and this work has been an endeavor to bring to light more information on the subject. Different kinds of pollen have different physiological make-up, therefore are different kinds of food.

Another use of this, after a key has been worked out, would be in the identification of honeys. Honeys contain scattered grains of pollen and may be identified by their pollen content. Nectar coming into the hive may be identified in the same way. The source of nectar coming in at any time of day, or week, may be identified by examination of pollen grains in the stomach contents of bees.

The principal plants that produce pollen in abundance in this locality (Ames, Iowa), are roses, corn, maples, squashes, smartweeds and buckwheat, composites, clovers, basswood, asparagus and apple.

Iowa.

PACKAGE BEES IN THE NORTH

By J. T. Floyd

THE purchase of package bees in the Canadian West is practically a new business, but one that is bound to develop into a large one as the honey-producing industry builds up.

The crop of honey in Manitoba alone was close to 2,000,000 pounds in 1922, and double that of the year before. This was due, in part, to the large number of packages and nuclei imported.

The cellars on the prairies are poor affairs, to say the least. The West is essentially a grain growing country and the storage of vegetables is not of very great importance, consequently the settler does not go to much expense. These poor cellars account for the loss of many bees and some claim it is cheaper to buy packages than to winter them anyway.

During the month from May 7 to June 7, over a thousand packages came through the customs at Winnipeg alone, and during that time not one package arrived entirely dead. A few were broken open and the bees lost, but this loss was very small.

Deliveries are Promptly Made

I made it my business to be at the customs house on every week day between the above dates, and I cannot speak too highly of the service rendered by the American Express people in the handling of these shipments. The warehouse at Winnipeg could not be improved on; the ceilings are high and the storage rooms on the back of the building away from the sun. They are well ventilated and the bees are well cared for until delivery is effected.

The shipments arrive at the warehouse about 10:30 a. m. and the telephones are kept busy an hour or so before that time, as the shipping bills come in about an hour ahead and the bee men are often in the building and take them out as soon as delivered, and in only a few cases where the parties could not be located did any package remain over night.

As I was personally acquainted with most of the buyers, I was of great assistance to the express people in placing the shipment quickly. Where the parties receiving them were beginners, I spent the afternons in assisting them to hive the bees.

The Nuclei Packages

As there were many shippers, it may interest some to learn the condition in which these arrived. The packages in which the queens were released on the frames were much the better buy. These seemed to be quiet and the death rate very low. Where they were made up of three frames these generally consisted of one frame partly filled with honey, one frame of emerging bees and one of eggs and larvæ. The position of these was plainly reversed on the trip during the week spent in the box. The brood had emerged from one frame and the queen working right along had filled it with eggs, some of which were hatched and the larvæ half grown. Where the queens were caged, many of them were dead for some reason or other, probably because they had been in the cages too long before shipping. These were the most unsatisfactory packages of all, as queen cells were developed and the beginner could do nothing but allow them to hatch, and these queens were often drone layers and of no use. Where the queens were alive in the cages, it seemed much harder to get them accepted than in pound packages. Many of these queens were released enroute and were nearly always missing upon arrival. Besides, the bees in these packages were uneasy and racing over the combs.

Where the queens must be shipped in cages in nuclei they should be confined in such a manner that it would be impossible for them to be released on the trip.

Some nucleus packages allowed for too much ventilation from underneath and the brood was chilled. Other shippers ventilated from the sides, and in these the brood was in good condition, but the death rate in bees was a little higher. A moderate amount of ventilation from underneath would be better than none at all.

The recipients of nuclei at first seemed much better pleased than the buyers of packages, as it seems more like business to receive them on the combs, but as the season advanced the packages far outstripped them.

No very large crops were reported from nuclei, but some of the packages were a wonder. Disease also appeared in some cases and this was very discouraging, as the Province has very little disease at present.

The shipping of two or three pounds on one comb was not satisfactory. The death rate was high in these packages. When only one comb is shipped it affords a very poor clustering space and in handling, the bulk of the bees find themselves in the bottom of the box at every jar, while in the three-frame nuclei they are right at home, having a much better clustering space.

The Packages

The two-pound packages seem to be the ideal. One shipper sent through hundreds of them with little more than a handful of dead bees in any package. It was a pleasure to see these big truck loads of bees clustered quietly in their cages.

One man received a shipment on April 17, in a snowstorm. He took them home, hived them in his basement on combs in ten-frame hives. These he kept for one month and sold them at $20 a colony, and they were the best buy of any colonies that I knew of. They all secured big crops of honey and the buyers, being mostly beginners, were delighted.

Packages arriving at this time, when the wintered-over colonies come from the cellar, gain rapidly on the strong wintered-over ones, and by June 1 they are on an even footing, and sometimes the packages are the best.

The one-pound package is too small to generate sufficient heat, and the death rate in the three pound packages is much heavier enroute, so that the buyer gains in the long run by purchasing two pounds.

Shipments arriving after May 10 did not seem to build up as well as those arriving before that time. We are likely to get some very warm weather toward the last of the month and we want the shippers to know of this danger. They must not jump at the conclusion that because we are in the North that any old time will do.

No cases of disease were reported in bees received in packages. The queens were easily introduced and the rapidity with which they drew foundation and built up was certainly wonderful.

Blacklist the Shippers Sending Disease

We found that certificates of good health were, in some cases, not worth the paper written on. One shipper, who advertises extensively, sent in many nucleus packages with the combs cut from box hives and placed into the frames with rubber bands and wire. In one of his shipments, consisting of ten pieces, every one developed European foulbrood before July. It is unreasonable to expect certificates of inspection to be of value in cases of this kind.

By keeping a list of shipments at the Customs House, we are enabled, when disease appears in one man's shipments quickly to check up on his others and in the case of this party we found American foulbrood in one lot and European foulbrood in four others, and always in the pieced

combs. This man will get few orders next season if we can help it, as he is receiving advertising of a different sort. He is only one, but it shows how one careless shipper can make the whole business unsatisfactory.

At the present time there is a strong movement to have importations of bees on combs prohibited, simply on account of this man's shipments.

The American Express officials stated that a greater number of packages of bees arrived in one day, May 15, than in the whole season of 1921, and they look forward to a still larger business next year.

OUR FUTURE HONEY PRODUCERS

By E. W. Atkins

DID you ever stop to think where we would be if Columbus had kept secret the discovery of America? Have you ever tried to imagine the stage beekeeping would be in at the present time if Rev. L. L. Langstroth had kept from the world his invention of the movable-frame hive, and all other inventors and investigators had done the same thing? Teaching boys and girls how to make beekeeping profitable is in reality divulging a secret. Will this policy injure the industry of honey production now or at any time in the future? In discussing this question there are a number of points to be considered.

Perhaps the one which stands out above all others is the question of over-production of honey. The United States Department of Agriculture estimates that there are approximately two hundred and fifty million pounds of honey produced annually in the United States, or, in other words, there is sufficient honey produced for every man, woman and child in the United States to each have 2½ pounds per year. The per capita consumption of sugar in the United States is 90 pounds per year. It may be admitted that honey will never, on a large scale, take the place of sugar, but the heavy consumption of sugar shows that the American public has a sweet tooth, and indicates a great opportunity to increase the demand for honey. This demand can only be created by the slow and expensive process of educating the public to the value of honey as a food, and by working out a practical method of honey distribution. To increase the number of men well trained in the production of honey and general business ability will hasten at less proportionate expense to each beekeeper the coming of better and larger markets for honey.

Bee Clubs Boost Honey

In Hampden County, Massachusetts, Mr. Otis E. Hall has organized six succesful boys' and girls' bee clubs that are the talk of the communities in which they are located. Friends and neighbors, many of whom have previously eaten but little honey, purchase all the young folks can produce. They buy it at fancy prices to help the children along and because they know that it is real honey.

Mr. Hall's bee clubs were not organized indiscriminately. In the first place, there have to be at least 5 children in a community who have some interest in bees, and in most cases the members' fathers have bees. Secondly, it is necessary to have a leader experienced in beekeeping who is capable of giving instruction.

Mr. Hall says: "The children usually demonstrate to their parents that it pays to give bees good management, and in several instances the members were so successful that their fathers turned all the bees over to them.

Business Methods Taught

The members of these clubs are required to actually purchase their bees and equipment. To finance the deal the members are each required to borrow the money on their note from their local bank. In this way, they are taught the fundamentals of business and self reliance. They have an obligation and get busy to meet it.

Each member is required to purchase 10-frame standard hives, full sheets of foundation and sufficient shallow supers to provide adequate storage room for a maximum crop of honey. Many members have 4 and 5 supers per colony.

Once a month each member receives a letter from headquarters giving seasonal beekeeping advice and a meeting is held every two weeks to demonstrate and discuss the business and practical apiary management.

In 1920 these six clubs had 91 members with a representation of over 200 colonies of bees.

Honey Consumption Increased

The members have various ways of selling their honey. Miss Mildred Wheeler, one of the youngest and most successful club members, produced an average of 76 pounds of honey per colony. She sold her entire crop to her mother's egg customers, and by so doing made many new consumers of honey. Allen Reynolds, another member, produced an average of 79½ pounds of honey per colony and sold it at a good price by roadside signs.

According to Mr. Hall a few of the members at first almost became discouraged by the stings, but after they have received a few lessons on how to handle bees, most of them became enthusiastic and successful beekeepers.

Wisconsin.

Hampden County Bee Club members receiving their bees and equipment. May. 1922.

HONEY FROM SOY BEANS

By Frank C. Pellett

Of late the soy or soja bean is attracting wide attention as a desirable forage plant and in some localities large acreage is being planted. The plant has long been cultivated in the warm portions of Asia for the beans. There the beans are used as the main ingredient of the condiment or sauce known as soy. Although cultivated in China and Japan from remote antiquity it is probable that it originally grew wild in the East India Islands, south Japan and on the coast of southern China. Of late it has been widely disseminated throughout the temperate regions. In addition to its use as a forage crop it is valuable for the oil in which the beans are very rich. Some authorities state that some varieties contain as much as 20 per cent of oil.

Soy beans were first brought to America by the Perry expedition from Japan and the seeds were distributed by the Patent Office in 1854. It was not until quite recently, however,

that farmers became generally interested in this plant. With the extension of the area planted to this crop it becomes of increasing interest to the beekeeper.

Information concerning its value as a source of nectar is meagre. It is well known that under some conditions it yields nectar freely, yet under other conditions the bees do not seem to find it attractive. Just what conditions of soil and climate are most favorable are not yet entirely known. Reports from the sections are very conflicting. While the author has not found the bees to work upon the plant in Illinois during the time of his limited observation, beekeepers from some localities write to say that bees work upon them from morning until night. Another report (from Tennessee) states that the bees work soy beans freely from about 9 a. m. until sunset. A North Carolina beekeeper reports that they work from early morning until about noon, or not later than 1 o'clock p. m. Further observation concerning the behavior of the plant under different conditions will be necesary to reconcile these reports.

The honey from this source is light in color, of peculiar but pleasing flavor and rather thin and light in body. A sample received by the writer from Mr. J. R. Pinkham of Washington, N. C., granulated rather quickly, but would be graded as high quality in most markets. The flavor is very distinctive and this honey should command a ready market once the trade becomes accustomed to it.

Concerning the yield Mr. Pinkham writes:

"Notwithstanding that the bees only seem to work on soy beans part of the day and that it does not seem to yield regularly every day, a strong colony of Italians will store from 100 to 250 pounds in 30 to 40 days, which about covers the blooming period of the plant. I had one colony which filled 175 sections this year."

In contrast to the above report Mr. Joe Gass, of Tyner, Tenn., writes that he has been unable to secure any surplus from soys, although the bees worked them freely and they bloomed at a time when nothing else was to be had. He found them valuable, however, as they kept the bees busy at a time when otherwise they would have been robbing, and stored some very light honey in the brood chamber. Mr. Pinkham writes that soy beans do not seem to yield as heavily on uplands as on the black swamp or Pocosin silt.

Since soy beans are attracting so much attention among the farmers and the acreage is increasing so rapidly, it is important that further information concerning the plant as a source of honey be secured. Any beekeeper who can furnish information concerning the amount of honey secured, the soil and climatic conditions most favorable or other notes of value will confer a favor by writing to this Journal.

DOES BEEKEEPING PAY?

By Arthur C. Miller

ARE we, beekeepers, business men, or just a plain garden variety of rubes? Sometimes I feel convinced that, taken as a whole, we are anything you please except hardheaded business men.

For a couple of years past, I have been "testing the market," so to speak, by putting out questions as to the profit in beekeeping, asking if it pays, how much it cost to operate a colony a year and similar questions. These questions have been spread from coast to coast and I was pained, but not surprised, at the scarcity of lucid replies.

My success at obtaining instructive replies at conventions was no better, and I was finally forced to conclude that the rank and file of beekeepers knew very little of the finances of the business. That there was some money left after paying expenses was about all they knew, and when there was not they were very silent. After much questioning, I found that, over a series of years and in various territory, most beekeepers had more or less money left after paying all bills and, considering the unbusinesslike rule o'thumb way in which the industry was conducted, there must be some inherent value or merit in the business, for what other line of agriculture can make such a showing?

But where is the profit, what is the expense, how big a business must a man have to enable him to rear and educate a family and give them a fair start in the world?

Despite all my own figuring, I do not yet know. I found two excellent articles on the commercial beekeeping business and it is worth the while of anyone interested to get and read them, or perhaps, the editor of the American Bee Journal may think it wise to copy them. One is by E. W. Atkins, of the G. B. Lewis Co., in the "Review" for June, 1922, and the other by F. W. Redfield, General Manager of the Superior Honey Co., in "The Western Money Bee" for June, 1921. In the latter paper's same issue is a very businesslike article on the Honey Situation, by E. H. Tucker, Economic Statistician of First National Bank, of Los Angeles. When such men handle the subject as they handle it, there is really hope for beekeeping as a live and growing business.

However, very little discussion or comment has followed these articles and it is in an effort to arouse further interest that this is written.

Among my questions I used the expression "Can anyone make money out of beekeeping beside the supply men?" Some persons resented this as a slur upon a very useful and helpful branch of the business. Do those persons realize the struggles the supply men went through before they got their business on a good footing? It was perhaps as bad or worse than that of the plain beekeeper of today. Just look at the expense they had to go to before they could find out what each part of their business was paying or losing. I am told that even today some of the staple things are sold at a loss, just because they were so long sold way below cost, and it has not seemed possible or wise to raise the prices on those articles to where they should be, but make up the deficiency elsewhere.

If the supply men could determine costs in all their diversified output, surely the honey producers could do the same and at much less effort or expenditure.

There are a few items which puzzle all beekeepers on their very first attempts to determine costs. First in pricing the beekeeper's labor; second in valuing his inventory, and third in separating the cost of the production from the expense of disposing of the crop.

I have attempted to get answers to the question: "What does it cost to operate a colony of bees for a year?" If we can find out that, we can at any time tell what our honey costs us, regardless of whether we keep a few or many colonies.

A few years before the war, two of us, independently of each other, attempted to do that, basing our labor at $5 per day, taking into account all the labor on a colony from one end of the year to the other, extracting 100 pounds of honey, figuring interest and depreciation, but not "overhead"; we each arrived at $2 as the cost of operating a colony for a year. Now, it would doubtless be over twice that.

The extensive honey producer would have many "overhead" expenses the small man would not have, while on the other hand the very size of his business would enable him to effect many economies.

To revert to my numeration of the items which bother most beekeepers in attempting an accounting of their business:

First, pricing his labor. I believe that he is entitled to as much as he would earn in his former trade or profession, modifying this by stating that an exceptional income way above the average is, of course, not to be expected. To illustrate, if a lawyer, or a doctor averaged $5,000 a year, let him charge his honey business, if he goes into it exclusively, with the same salary and then get busy and earn it by brains and enough bees to make it possible. But if he was getting a big income, say $75,000 a year, and was forced out of it by ill health, of course he could not expect any such return from the bees.

Second: Valuation of the inventory. Many items, bees for example, must be treated arbitrarily. I consider only colonies which are strong enough to pay for their keep. Nuclei,

swarms, etc., are not counted, chiefly because the inventory is taken in the cool season when there are no swarms or nuclei. All colonies are priced alike, be they "big" or "medium," pure Italians or hybrids. I adopted an arbitrary price, placing it at the price of a standard one-story hive nailed and painted and foundationed. In other words, the bees make any standard hive worth as much as a new one and not much more. Hives with frames and combs, but without bees, are arbitrarily priced as the same things, with foundation, are listed in the flat, figures that are always accessible and fairly stable. Supers and spare parts are listed separately.

After the inventory is completed, it is carefully gone over and everything of doubtful value rigorously crossed off. What remains is priced carefully, trying to hit an average between what it is worth to me in the business and what it would bring at a forced sale. This is not easy to do the first time, but repeated efforts will bring a fair degree of accuracy.

The third item, that of separating selling costs from producing costs, is not very hard if one bears in mind that one has drawn a year's salary for producing honey and that if part of the year is spent in selling, that that time and labor have been paid for and are included in the cost of production.

Some of my good friends take issue with me on the point of separating producing and selling costs, saying it would be better to put everything in connection with the honey, from one year's end to the other, under the head of production, because getting the honey onto the market or into the consumer's hands was a part of its cost. I see their viewpoint and I concede its correctness.

But for the purpose of accurate accounting, to the end that one may keep track of all parts of the business and more readily tell where to look for leaks and make economies, it will be found advantageous to itemize all branches of the business as Freights, Containers, Labor, Advertising, etc. This will be found more important if one buys honey for piecing out one's crop or for blending purposes.

When one considers depreciation, there may be some question as to how much it should be. On some articles it is slight and on others heavy. I think Mr. Atkins' 5 per cent on the general line of things a trifle low, and I place my own at 10 per cent. The depreciation charge of 20 per cent on the automobile is in keeping with that of other users of autos. But all these things need much discussion and comparing of notes.

If we are going to stay in beekeeping and make a real business of it, we have to do it in a businesslike way, and whether we like the work or not, we must keep accounts.

And now, fellow beekeepers, criticise this all you can. Stir up all the discussion possible. We cannot know too much about the financial side of our rightly beloved industry. For years we have used reams of paper and gallons of ink discussing equipment and management, and there is still much which will probably be said, but until we can clear up the financial side of the business, let us ignore equipment and methods and devote ourselves to finding out whether we are rich or busted; whether it "pays," and we can be proud to be in it, or must always apologize for being identified with it. Shall we be "chesty" about it or ashamed of it?

Providence, R. I.

THE SOLAR WAX EXTRACTOR

By W. J. Sheppard

No apiary equipment, however large or small the apiary, can be considered complete without a solar wax extractor. This most useful appliance will very soon repay its cost, not only by the trouble it saves, but in the amount of wax that, by its use, can very easily be prevented from going to waste. When hives are opened, if every little piece of comb that is removed is put into a box, or other receptacle, kept in a convenient place for the purpose, it is astonishing how quickly this will accumulate, and the solar wax extractor soon transforms it into merchantable wax, with a present value of about 50 cents per pound.

For rendering down cappings, at honey extracting time, the solar extractor is almost invaluable for saving both time and labor. A piece of muslin or cheesecloth is laid in the tray of the extractor into which the cappings are then placed. If this is done in the evening, most of the honey left in the cappings will have drained out into the tin pan at the lower end by the morning, when it can be poured off. It will then be in readiness for the sun to do its work. An hour or so of bright sunshine is usually sufficient to start melting the cappings and cause the wax and remaining honey to filter slowly into the receiving pan. The wax, being lighter than honey, floats on the top, and when cool solidifies. It can then be taken away in a cake and the honey below poured off. It is important not to leave the honey in the pan of the extractor exposed to the sun too long, as the heat will cause its aroma to be lost, and will also darken its color. Therefore, as soon as the wax and honey have all run out of the tray into the receiving pan it is advisable to either move the extractor into the shade, or to cover the glass with sacking or other material to answer the same purpose. When the honey and wax have all drained out of the tray, and before the latter has had time to cool, the cheese cloth, in which all the refuse is left behind, can be easily peeled off. This will leave the extractor absolutely clean, and in readiness for use again at any moment. Wax rendered by means of a solar extractor is cleaner, lighter in color, and brighter in appearance than that obtained by boiling.

The illustration shows a handy and inexpensive solar extractor, designed by the writer, which does excellent work and is suitable for a small apiary. For a large apiary the size could be increased, or several small ones could be used, which would probably be a more convenient arrangement.

The measurements are as follows:

Material—Three-fourths inch double dressed lumber.

Length—28¾ inches, outside.

Width—16 inches, outside.

Depth—8⅛ inches, outside.

Length of metal tray—18 inches (with lip extending a further 1½ to 2 inches).

Width of metal tray—14½ inches.

Depth of metal tray—4⅝ inches.

(The tray is made of bright tin and stands on a raised platform which brings it up level with the top. At lower end of tray is a removable screen, made of wire cloth, with bound edges).

Length of tin pan at bottom (removable), 8 inches.

Width of tin pan at bottom (removable), 14¼ inches.

Sheppard's solar wax extractor.

Depth of tin pan at bottom ,removable), 3¼ inches.

The cover of the extractor is made to lap over all around, which will be found preferable to its being hinged, and it is arranged so as to take double glass, which retains the sun's heat better than single glass.

The folding legs, at either side, are placed at one end, so as to give the necessary fall of about 45 degrees.

A small solar extractor can be made at home, without resorting to a tinsmith, by making the tray and pan out of 60-pound honey cans, or gasoline cans. The can is cut through the middle, lengthwise, to give the necessary depth, and the wood work made to correspond. The lower end need not be cut out entirely to fit in a removable wire screen, as if an opening of about an inch deep is provided at the bottom, the cheese cloth, through which the wax and honey will filter, will cover it. Instead of cutting the piece entirely out to make the inch opening, if only an incision is made the metal can be folded down so as to form a lip to project over the edge of the receiving pan. The latter is made out of a second gasoline can.

Nelson, B. C.

THE HUBER LETTERS

Concerning Ventilation

(Continued from December)

Lausanne, June, 1829.

How happy I am, my dear friend, to see your mother, your aunt and yourself occupied with a subject which has much interested me and which offers observations so singular that, in spite of my confidence in the worthy Burnens, I am delighted that other good and dear eyes have seen what he saw. I have once before desired to procure this satisfaction; for that purpose I addressed Mr. De Vegobre, being well satisfied that if he saw what we did, his opinion would draw that of other learned naturalists and would give more weight to mine. He had a few hives of bees at his disposal and complied with my desires with his usual kindness. His first attempt was unlucky and I had the chagrin of learning that he had seen nothing of what we had seen. I understood what had prevented him from giving in to my first assertions; but without insisting, at a moment when his health perhaps did not allow him the leisure of taking part in my little interests, I resolved to wait, that he should come back to it himself in more favorable circumstances. That moment has arrived, as I had foreseen.

I here transcribe for you a portion of his letter in which he tells me that we are now agreed upon the existence and necessity of ventilation, applied in the hives to the renewal of the air, the only process capable of keeping up the salubrity and therefore the life of their numerous inhabitants. The letter of which I speak is of May 29, 1829. Mr. De Vegobre inhabited then the protestant parsonage of Fernex; he had the use of a large and beautiful garden. Here is what he wrote, in exact words:

"But this garden, in which I am still able to drag myself, I find in it a fine company, neither more nor less than a hive of bees. . . . Ah! here is Mr. Huber waking up, a hive! Well, speak. Alas! yes, a real country skep, a big round basket, that is all. What can I see there? I have at least verified the observing of ventilation at the entrance; the great speed of motion of those grayish wings, almost transparent, is the reason why, in a dark spot, it evades the sight of eyes which are not good."

It is exactly what I had guessed. In a better lighted spot, and in the middle of a fine day, we have often noticed that the extreme speed of the motion prevents one from seeing distinctly the shape of the ventilating wings and that they appear then only in the shape of a little cloud with which the body of the bees appears surrounded. By the watch, the same workers appeared to ventilate for 14 or fifteen minutes, though sometimes less. What muscular strength do not the least oscillations indicate in the wings of bees? A strength equal, if not superior, may also be noticed in the muscles of their legs; you will have many occasions to ascertain this when you see a single bee, hanging to the ceiling of your hive, sustaining many others fastened to her legs by the hooks of their feet.

Will you kindly, dear Elisa, add this sheet to that of my letters where I speak of ventilation? It is well that an extraordinary fact should not want for confirmation.

In another occasion, Mr. De Vegobre has also corroborated one of my most important observations. I will mention it to you when we raise the question of the architecture of bees.

The Laying of the Queen

Lausanne, July 7, 1829.

No, my dear cousin, I did not think you capable of risking the danger which you would run if you were to observe the bees without the obstruction of the glass; you will be able to see a great deal without running any risk. The experience which you have just made of it and which placed under your eyes so many interesting facts, must enable you to go very far, by keeping on the defensive. One must open a hive when one wants to take honey, but you have not gone that far. I have written to Sophie that a hood is indispensable; you have a year ahead of you to secure one. Until then you must leave your glass hive at rest and give no trouble to your bees. Their storing of supplies takes a great deal of time; the question for them is not only to live from day to day, their future is also in their hands; they are not, as some people believe, dormant during the bad season. The honey and pollen gathered during the fine days must serve to feed the entire colony in the bad days, and through the order which has been given them for this, we can see that nothing essential to them has been forgotten.

You know well that some other beings are not subjected to this apparent foresight, the dormouse, the marmot, become torpid, sleep; and during their more or less deep hibernating, they have no need of food; the bad season is a time of vacation for them. The bees have no respite, and here is why:

1. Their queens, according to Reaumur, have at least 100,000 eggs to lay each year; therefore they have no time to lose, so they begin their laying in the middle of January, that is to say, in the height of winter. What would become of those poor young ones if they did not find around them nurses and food to be given them?

2. Since your hive has been inhabited since June 3, it was in the first days of that month that its queen must have begun her laying; you know that 21 days are sufficient to hatch adult bees from the time the eggs were laid in the cells. Worker bees have therefore had more time than needed to go through their entire development. The first care of their companions is to fix those cradles so they may receive new eggs, for several generations are reared successively in the same cell; you have caught them in the act. It is not in this as it is with our hens, whose eggs need to be set upon; in order to hatch, the queen's eggs need no incubation, the temperature of the hive is sufficient; it is only when the egg is hatched and when the little larva comes to life and has thrown away its shell that the workers care for it more closely. The number which you have seen gathered together were there for that purpose.

Whenever you wish to know whether there is brood in the hive, that is to say in any part of a comb, touch the glass with your hand and compare its temperature with that of neighboring parts; your eyes will also tell you that something interesting is happening there; you will see the bees there moving about much more and fret, so to say, and even hum more strongly.

(To be Continued)

MY PET BEES

By William Reynolds, age 12

This is my second year in bee club work. It has been a source of great pleasure as well as a little profit financially.

I started this spring with only four colonies and one of them was queenless.

My first job was to requeen this colony. April 14, 1922, Mr. R. B. Willson, bee specialist, came to examine my apiary and transferred a worker larva under 36 hours old from Colony No. 1 into a queen cell in Colony No. 4. We gave this colony two good frames of sealed brood from Colony No. 1. Mr. Willson told me Colony No. 1 was unusually strong. We clipped the wings of queens in colonies 2 and 3.

April 13 I went with Mr. Willson to College Hill, where we transferred

a colony of bees for the Agricultural High School and clipped a queen's wings. I enjoy going to other apiaries and learning all I can about the bee business.

May 30 I, with our Home Demonstration Agent, Miss Doney, visited several apiaries. First we went to Mr. McCorkle's and transferred a colony from an old vinegar barrel into a new ten-frame modern hive. The bees had gone in through a hole in the barrel, so we turned the barrel up to burst the bottom out so we could drum the bees out into the hive. There were several gallons of vinegar in the barrel, so we drowned the queen and some of the bees, yet we got a fair colony into the new hive.

Then we went to Mr. Hugh Kinmon's apiary and went through his colonies, finding all O. K. Then we went back to town and examined Henry Minor Taser's bees; found them in good shape and most ready for a super. This is Henry's first year in the bee club. I think his hearing me talk so much about my pets influenced him to try his hand.

Only two of my colonies made surplus honey. Colony No. 1 made 57 pounds and No. 3 made 35 pounds. I sold $11 worth in the spring, and will have more for sale after the fairs.

June 21 I received my prize queen and introduced her to Colony No. 2. She was accepted.

June 4, Colony No. 3, which has a queen with clipped wings, swarmed and settled on a little cedar bush in front of a hive. In a few minutes they found the queen missing and all returned to their hive.

Took three frames of brood with capped queen cell and all the working bees that would cling to the frames and put them into another modern hive. The queen emerged and has reared a good colony and put up enough honey for the winter.

I left one capped queen cell in the original hive so they would have a new queen in place of the clipped one that had disappeared. This one emerged and I had no more trouble with them trying to swarm.

At one time, while examining my bees I saw a queen flying away from the frame. I thought I had lost her; but, to my surprise, the next time I examined them I found she had returned.

June 9, a friend offered me a colony in an old box hive if I would rob them for him. I was glad to get the colony, so I went right over and transferred them into my modern hive.

July 19, I decided to divide Colony No. 1, as it was strong and I wanted more colonies. I took three frames of brood, pollen and honey, together with all the worker bees that were on them and placed them in an empty hive, moved the original hive to a new place and put the new one where the original one had been. Then all the working bees that were in the field came to the new hive. I had no queen for this new colony, so I ordered an Italian queen and introduced her in the cage, July 20. They are working finely and rearing lots of young bees.

July 28, I visited Miss Doney's and Henry Faser's apiaries.

July 29, I bought two colonies in old box hives at $1 each.

August 11, Messrs. Wallace and McGhee, the Government Inspectors, transferred one of these colonies into a new hive. This one being queenless, we took a frame of brood with a capped queen cell from another colony and gave it to them. In four days after transferring the queen had emerged.

The inspectors complimented me upon my bees and apiary very much; no sign of any disease and in better shape than any they had examined so far in this county.

August 12, I transferred the other one I bought into a new hive.

So you see I have increased this year from four to nine colonies.

Mississippi.

QUEEN BREEDING ON THE COTSWOLD HILLS

By A. H. Bowen

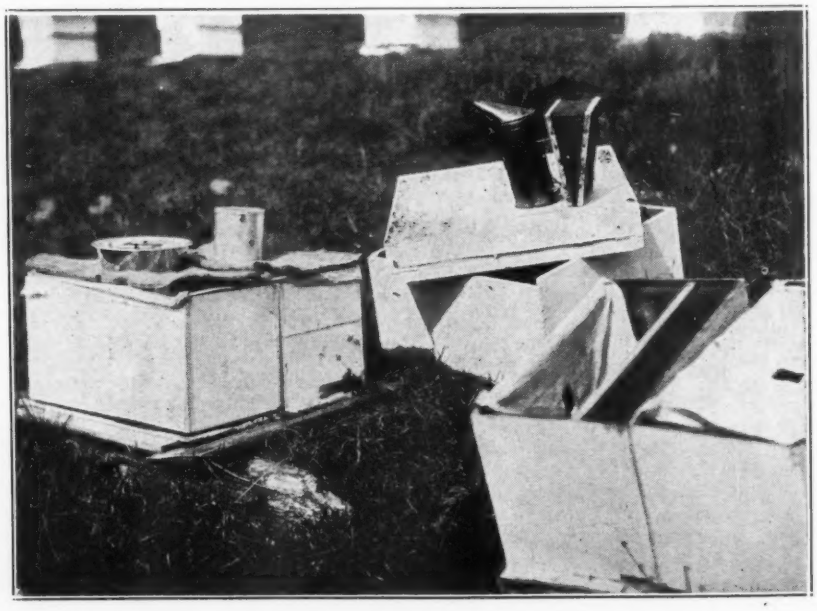
THERE is no more fascinating branch of modern bee culture than queen rearing, and certainly none deserving of greater attention. In England, on account of our short and temperate summer climate, it is not possible to develop the wholesale raising of queens to the extent that it is practiced in America. This, however, is not without its advantages, for what is lacking in quantity is more than made up in quality and we are able to devote greater attention to breeding for improvement.

Owing to our springs being invariably late, it is not possible to start operations before well into May, but the genial autumns enable one to continue breeding right up to the middle of September, at which time pure matings are more numerous because normal colonies will then have turned out their drones. In selecting an outapiary for queen rearing partial isolation is an advantage, for the presence of scrub stock around is likely to have a disturbing effect on pure mating.

By May, in our apiary, all colonies will have been gone over and gotten into good condition. Then the apiary is divided, selecting the colonies which are to produce honey and those that will be used for starting and incubating cells and for the formation of nuclei. Extra strong colonies are left for honey production and the medium ones for building cells. Usually those colonies that produced queens and made the nuclei last year will be allowed to produce honey during the present season. Thus half of the apiary secures honey while the other half produces queens and increase.

The advantages are obvious. The intermediate rest allows for the requeening of each colony during the summer, for the renewal of half of the brood combs and for the infusion of fresh, vigorous blood into all stocks employed for breeding purposes. Thus the vitality of the bees can be fully maintained and losses are almost entirely avoided. As a result of the renovation of the apiary every two years there is a very remote chance of bee diseases getting a footing.

The bees employed are chiefly Goldens and three-banded Italians. On the arrival of settled warm weather cell cups are grafted from two of the best breeders in the yard. The cell carrier is placed in the cen-



Bowen's double queen-mating hives.

ter of a colony prepared the previous day by taking away all brood and giving in its place combs of honey with two frames containing advanced sealed brood. Four days after most of the cups will have been filled out and sealed. Dutch bees are generally used for this work as it is important to have the cells lavishly supplied with royal jelly.

Directly a batch of cups are sealed they are placed, till wanted for distribution to nuclei, either in a part of the brood-nest from which the queen is excluded or in an upper story over a strong colony. Nine days after grafting the cells are distributed to nuclei and once a nucleus is established cells are given at regular intervals. One can rely on getting two queens fertilized from each nucleus per month, counting the mating season as June, July, August and part of September. Three each month if virgins are given. We use full frame nuclei, which give good results in England. They are practically self supporting and in late autumn when the surplus queens are removed, two or three nuclei can be united to form one strong colony for the winter.

Italian bees are popular in England and there is a brisk demand for home raised fertile queens of this race. The price ranges from $1.25 to $2 each. Nuclei on three combs, $3, while full colonies on 8 frames sell for $6 to $8 each. Italian-English halfbreeds produce good crops of honey in an ordinary summer and are even said to be partially immune to the Isle of Wight disease.

Cheltenham, England.

Copford apiary in winter.

MEMORY OF LOCATION IN QUEENS

By Prof. Dr. H. v. Buttel-Reepen.
Oldenburg i. Old. Germany

A BEEKEEPER, S., at Hildesheim (North Germany), gave some months ago in a German bee journal (Bienenwirtschaftliches Centralblatt), his "practical experiences" and his "opinions" about the homing faculties of queens and about the extent of the wedding flight. He comes to the conclusion that queens do not fly more than 50 meters away from the hive and that they have a very bad sense of orientation. Is that true?

Time and Duration of Marital Flight

In my book, "Leben und Wesen der Bienen," 1915 (Life and Nature of Bees), I said, about the daytime when young queens begin to fly out, that it takes place from about 11 o'clock in the forenoon. This statement has undergone a severe criticism by a beekeeper living in the neighborhood of Berlin, who judged only by his small personal and local experiences. From such a small and close point of view, as usual, generalizations take place which commonly put many observations in a wrong light. He says, and the beekeeper S. says the same, that queens leave the hive only between 1 and 3 o'clock p. m. That agrees with these parts of Germany fairly well. Nevertheless it is not quite exact, and 1 to 3:30 o'clock will cover the facts better.

But my remark was not the result of investigations for parts of a country, but tried to cover these events in the whole and it was based on statements in different countries. The famous Francois Huber, whose "Unedited Letters" now appear in the American Bee Journal, writes several times in his unsurpassed book: "Nouvelles Observations sur les Abeilles," (1814, 2nd edition), that his queens used to fly from 11 o'clock a. m. and Dr. v. Krasicki, at Karsewo (Poland), and Dr. Ed. Assmus, in Lipsia, noticed 11:30 and 11:45 o'clock (Bienen-Zeitung, 1873 und 1874).

As the United States have the most varied climates, it would be of great interest to learn what experiences have been made there in this respect.

The well-known beemaster, Baron v. Berlepsch, living in Mid-Germany, saw a queen leaving the hive at 10 minutes to 4 o'clock p. m. and coming back at 19 minutes past 4 with the signs of having been fertilized. Another of his queens returned only the next morning at 9 o'clock, having been outside the whole night. Apparently she was benumbed with the sudden thunderstorm-rain in the afternoon, and the warm sunshine awoke her the next morning so that she could reach her home again.

How Far Do Queens Fly?

Now the question arises, how far do queens fly on their mating tour?

In the early fifties, when the yellow Italian bee **(Apis ligustica)** was cultivated for the first time in many apiaries in Germany, there turned up hybrid colonies in bee houses which were more than 8 miles (English) distant from the spot where Italian bees were kept. Evidently fecundation of the black queens with Italian drones had taken place.

There are many such cases reported in the German bee literature. Davis, in Youngsville, Pa., owned the first Italian bees in the State. In his outapiary, about 5 miles distant, with only black bees, suddenly hybrids appeared in one of his colonies. (American Bee Journal, 1892).

Now there are three possibilities: Either the black queen had flown to the vicinity of the Italian stock and met there the yellow drone, or the latter flew to the black bees, or the black queen met a yellow drone, perhaps half way. Usually most beekeepers accept the last possibility.

Drones Fly Very Far

It seems to be a fact that drones fly very far, farther than worker-bees commonly do. A beekeeper, H. Seyffarth, in Oberfranken, kept several nuclei in a mating station (Beleg station), far off from his apiary. He brought the colonies back to his garden, except one nucleus which was queenless. When he returned two days later he found the hive crammed with drones. The drones had found the way back to the place, but no workers. There have been several observations made which support the fact of the faculty of drones to find their way over long distances and it is quite comprehensible that some apiarists believe that not the queens but the drones fly farthest.

Mating of Queens Close to Their Hives

About twenty years ago I noticed in my home apiary the mating of a queen only 10 meters away from her hive (Bienenwirtschaftliches Centralblatt, 1905), and we have some other statements of this kind (Klipstein, 1867; Mann, 1892, etc.) Sometimes queens have been mated during the issue of a swarm. In the month of July 1890, an afterswarm in the bee garden of Mr. J. B. Buchholz, in Hasslach (Black Forest), issued and settled on a tree 15 meters distant. After a short time the swarm went back to the mother hive. Buchholz looked for the queen in the hive but there was none to be found. Going to the tree again, he suddenly saw the queen on the ground in copulation with a drone. He caught the couple, which tried to get rid from one another but in vain.

He put it in a small glass and says that the queen died shortly after too.

I am in possession of this couple; queen and drone hanging together as

will be seen by the drawing (Fig. 1). This couple is unique, and I am quite sure hundreds of years will pass by before such a pair, which is still in strongly fixed coherence, will be caught again.

Mating of Queens Far From Hives

In all these cases where queens were fecundated immediately after the beginning of the flight, very likely the drones belonged to the same apiary. But there have been reported some events which show that queens have been fertilized far from their homes. I wrote about such a queen in Bienenwirtschaftliches Centralblatt, 1919. This queen was about to be mated for the second time, when sitting on a leaf apparently tired after having been fecundated, some minutes before, with success. Nobody saw the first impregnation, but we may presume that it took place when the latter, as already said was sitting on the leaf of a potato plant. The drone did not succeed, but fell down dead after trying his best in vain. This queen belonged very likely to an apiary which was about 600 meters distant.

That queens fly farther than Mr. S. presumes has been ascertained also by v. Berlepsch. He brought a nucleus to an outapiary half an hour away from his bee garden. The young queen in this small colony had already flown out several times, but without result. Some days later v. Berlepsch found this queen at her old place in the home apiary and he put her into a cage. In the evening he went to the outapiary and gave the queen back to her colony, which showed all signs of being queenless.

Are There Wedding Markets in the Air?

It is well known that there are certain places, usually on the tops of hills or above trees, where ants and bumblebees come together on their wedding flight. This has already been noticed many times. In certain cases clouds of ants surrounded the spire of a church, so that people first thought the steeple was burning, as the whirling of the gray wings of the many ten-thousands looked like smoke.

Is there anything like such meeting places with our bees?

It seems so; but as far as I know, there have been only very few observations of this kind.

In the year 1850 v. Baldenstein, a prominent beekeeper in Switzerland, who, by the way, imported the Italian bee in the year 1843 to his native country, described the following observation in the old well-known German "Bienen Zeitung": "On a clear, bright summer day I heard a sprightly humming above fruit trees which were standing between my house and the village situated about ten minutes from my abode. I had already heard it in the previous year at the same place and had thought there must be a swarm in these trees, but I looked for it in vain. Now I convinced myself that this humming came from drones, who in bright weather, during the warmest of the daytime, gathered there in great numbers and with loud humming whirled around as if it was a market. It is very probable that this humming induces the young queens who are flying about to meet a drone, to fly to these places where there is opportunity to get fecundated."

Another observer, Dobbratz, at Benz (Northeast Germany), writes as follows: "There is a large open sunny ground in the park at this place, which ground lies a little higher than the environs. Above this grass plot there is always a brisk humming at the time when drones are flying. It sounds as if thousands of drones have there a congregation. In the last two summers I have positively noticed that this humming derives from drones."

I do not doubt that this was a "wedding market," too.

The best observation, which shows that meetings of this kind are really intended to draw queens to these places, was made by Doolittle. He gave an interesting description in "Gleanings in Bee Culture" (1892). Sorry I do not have the original report at hand, so I can only give a translation of the German translation (Leben und Wesen der Bienen).

Doolittle saw the mating of a queen when some miles away from any apiary. He is strictly convinced that drones do not fiy at random, but have fixed meeting places. He reports as follows: "I was busy with rural work on a high hill, in the beginning of August, when I witnessed the mating of a queen. On every beautiful afternoon from 1 to 3 o'clock I heard at this place high in the air a loud humming, but as I could not see anything, I thought it must be flies. On a hot day, being tired, I laid down to rest, and as I heard this swarm noise again, I shaded my eyes with my hands and made every effort to ascertain the cause of the noise. After a while I saw thousands of small beings flying in all directions, and finally observed a dozen flying towards another one and overtaking it. Two of them continually turning round each other came slowly down to earth and settled on an ear of Indian corn close to me. I jumped up, but before I reached the ear the one which I recognized as a queen flew away, and on the ground I found a dead drone."—(Gleanings, May 15, 1892).

In one of the next numbers of "Gleanings in Bee Culture," Markley and France confirmed the observation of Doolittle as far as concerns the meeting places of drones.

Alois Alfonsus, editor of "Bienen-Vater," also saw such a bustling gathering of drones (1894), but he had not the luck to observe a mating.

As the guidebooks for beekeepers do not say, it would be of great interest to hear if meanwhile there have been other observations of this kind in America.

Sense of Orientation in Queens

Up to now most observers were of opinion that queens have a better memory for location than even the worker bees. But Mr. S., as already mentioned in the beginning of this article, claims that it is not the case, as young queens often miss their homes, when coming back from their marital flight. But this observation is not decisive, especially if one takes in consideration that in Germany the hives usually stand very close together and very often in tiers one above the other.

Nobody doubts that worker bees have a very good sense of orientation, but nevertheless they very often miss their wigwams. Some 20 years ago I prepared, together with the well known beekeeper, Rud. Dathe, about 50 skeps for carting to the heather. Among these skeps (Luneburger Stulper) there was only one colony with Italian bees. But when we turned the skeps, which were standing in a rectangle, we found Italian worker bees in every skep.

In my book, "Are Bees Reflex Machines?" experimental contributions to the natural history of the honeybee (The A. I. Root Company, Medina, Ohio, U. S. A., 1907), translated by Mary H. Geisler, I wrote the following about the location perception in the queen: "In the literature of apiculture the observations concerning the memory of locality in the queen, as far as the duration of this memory comes into question, diverge very far from each other. Some say that she has capacity for remembering her hive, the outside and surroundings of which she learned to know in her single virgin flight, for more than three years; others say, for some days or weeks. The source of failure in these observations is connected with the frequent unnoticed changes in queens disappearing unknown to the beekeeper. He often thinks that he still has the old queen in the hive, when she has been replaced for some time by a new one.

Queens which fly away from the comb just taken out of the hive usually get lost because they cannot find their way home.

I made the following observation: When a queen flew away as just described, I stood perfectly quiet, exactly as I was when she flew, in the hope that, if she had no memory of her hive, she would surely return to the place from which she flew, since bees which have not before oriented themselves always go back to the place from which they flew. After barely a quarter of a minute the queen settled down again, not on the comb, to be sure, but upon a little piece of board which lay in the grass a step distant. There I caught her easily and put her back in the colony. By keeping quiet and not changing

the surroundings I followed an old beekeepers' rule, a practice developed from such observation as the above.

But it has undoubtedly been established many times by reliable observers that a queen finds her way surely to the entrance of her hive a month after her marriage flight.

A young queen often errs when the hives stand very close together, if she returns hastily from the marriage flight. If hives from which flight will take place are marked, therefore, for example, with a twig covered with leaves, her return is very much more assured. This is proof that the queen impresses accurately upon herself the appearance of her dwelling."

Observations increase that virgin queens usually take several flights of orientation before the proper marriage flight is undertaken. I have therefore very likely to correct my above statement of the "single virgin flight." In the excellent English "Bee World" Joseph Tinsley, lecturer on beekeeping, the West of Scotland Agricultural College, Kilmarnock, gives the results of his investigations in this respect. He says: "When the virgin hatches she may take a short flight a few days later, and further flights on sucessive days, if the weather is favorable. Some have taken as many as six flights before the actual mating trip. These flights are of short duration, varying from one to three minutes. The weather is an important factor in this respect. Singularly, there is no excitement displayed by the drones in the hives. By some peculiar instinct they seem to know that the virgin is only exercising her muscles and incidentally becoming conversant with the surroundings. But when the appointed day arrives the drones in the hive are ready and are on the wing. It is obvious that the drones in the hive, be they related to the queen or otherwise, have the best chance of overtaking her; and judging from the time occupied for the mating trip, the queen does not go very far afield. We have had queens mated in five minutes."

It is comprehensible that these quiet flights of orientation escape observation very easily, nevertheless they have been noticed many times; they usually have not been regarded as only flights of orientation, as Tinsley suggests, but I think his opinion quite right. It is to presume that the queen, on her real marriage trip, being in rut, has a peculiar odor which excites the drones.

From the above will be seen that queens often are fecundated close to the apiary, but other observations show that this is not always the case, and I may say, once more, that it would be of great interest to hear more of those meeting places.

The Antiquity of Foulbrood

According to Langstroth, foulbrood was probably known to Aristotle, who was born in Stagyra, Macedon, about 384 B. C.

RANDOM REMARKS ON QUEEN BREEDING

By John Protheroe

THOSE who keep in touch with European bee literature must have been struck recently by the revolt against what the writers call "artificial" methods of queen raising. Several writers who are entitled to be listened to with respect even go so far as to insist that no really first-class queen can be raised outside of a skep or gum—isolated from human interference. They seem to ignore the fact that the skep or gum is in itself a human interferference. They speak about natural processes as if no beast were of any account but a wild beast, as if the whole science of stock breeding were not a control and direction of natural forces.

They object particularly to the grafting of cells. They are bound to admit that increase would be exceedingly slow if left to nature uncontrolled, so they are driven to advocate the saving of swarm cells—a beautiful method of perpetuating the swarming fever, and a most unnatural proceeding, seeing that nature would have destroyed them. Then there are what I should call "modified naturalists." These people advocate the dequeening of hives so as to get an embroidery of "natural cells" around a strip of half drawn foundation, as if dequeening were not a violation of nature. Sudden death, due to accident, is a catastrophe for which nature makes no provision, but which she does her best to remedy; when a vigorous laying queen suddenly disappears from a hive the colony receives a violent shock and the bees have to do the best they can in a hurry. Without pursuing the matter into further intricacies, I think it fair to hold that dequeening is a violation of nature. The only natural cells are those raised under the swarming or supersedure impulse.

All this criticism based on a devotion to nature will not bear looking into. Darwin's "Origin of Species" is a picture of the most appalling waste and the most reckless expenditure. It certainly is no model for human civilization. It is a report of public extravagance on a scale such as no probing commission ever had to wag their heads over. Here we see nature taking a thousand years to vary some quite unimportant bug. You and I, as practical beemen, would like to get results in half a century, or even less. No; the fact is that we can speed up nature. We can control her with reins and blinkers and we can make her travel faster than she would like to; and this we do by employing "artificial methods."

I do not recall having read anywhere, certainly not in any American publication, the sad but undoubted fact that Nature is a snob. Have others blushed for her and passed on without a scathing remark? What convincing reason can be produced in support of the crude primogeniture practiced in the beehive? Why should we suppose that the first hatched virgin is a better bee than her sisters in a later stage of development? Indeed, there is a probability that the first-hatched virgin was raised from a larva that was about the age limit for queens in cases where the sudden failure of a queen set the colony to raise a new one in a hurry; in such a case we may take it for granted that the later cells would produce better queens. Even in the case of eggs laid in queen cells why should we suppose that the first virgin to hatch is better than her backward sisters? Nature tells her to hustle around and destroy them, regardless of the possibility that in so doing she may be destroying the progenitor of an improved race of bees. Aristocratic societies do not go so far as to do this. They allow their younger sons to emigrate and pursue happiness abroad; they do not annihilate them. Nature, then, is absurdly slow and extravagant, and she is a believer in the folly of primogeniture; it is up to man to discover a sequence of artificial manipulations that shall do shortly and economically what she does tardily and expensively—secure propagation of improved types.

It will always be more advantageous to graft twenty-four-hour-old larvæ than to graft eggs, for the mechanical reason that it is more easily done, and for the further reason that it is just as good a way of obtaining the desired result. There is no evidence for a belief that a queen raised from a grafted egg would be in any way superior to one raised from a larva that had not passed the age at which the composition and quantity of food undergo a change. We are told by the analysis that this change does not take place until the third day after hatching. But another factor enters. No conscientious breeder likes to pick large larvæ, because the older they are the faster they feed, the sooner their delicate skins become papery and dry, and the more harmful becomes the necessary interruption in their normal existence. These objections are lessened by placing the larva in a cell from which another has just been ejected. For queen yards with a very large output this double graft may mean a good deal of extra work, but it also means a saving in cells sacrificed for royal jelly and it means that all larvæ are immediately embedded in royal jelly of the best and freshest kind. On the previous day the bars can be rapidly dry-grafted with larvæ from any old stock, and the next day the cells are ready prepared for a quick final graft entailing a minimum of interruption to the larvæ

transferred and to the breeding colony.

The value of a queen raised from a large three-day larva is a nice question. Though the scientific people tell us that there has been no change in the food, yet we wonder if the size of the cell and the quantity of food therein have not begun to affect the larva. Undoubtedly queens raised from three-day larvæ are mean in appearance. Biology insists that there is no degeneracy in the quality of the stock transmitted by a poorly developed individual; so we may take it that a queen which has been so far developed during the stages of its growth as to be capable of mating and laying fertilized eggs can transmit unharmed to its posterity all the qualities it has inherited. It has been established that a laying-worker drone egg, when placed in a full-sized drone cell and properly fed, develops into as big and potent a drone as one from a queen's egg.

Recently there have been several articles in the American Bee Journal laying stress on the necessity of having good drones and plenty of them. The part played by the drone in influencing his posterity is most uncertain at present. In the case of mismated queens it is most interesting to note how the black daughters of a golden queen, although of paternal color, can show maternal quality. As far as it is possible to see, the offspring of a mismated queen are similar in quality though variable in appearance. In trying to obtain a cross-bred strain such as I have christened Carnitalian, one is faced by the fact that in the matter of color there is a different problem from that of disposition. Disposition varies with the colony; color with the individual. In the case of a strain other than an experimental one all breders aim at constancy and beauty in shape and marking. This is as it should be. Governments and associations would not offer large premiums for thoroughbred Herefords, Holsteins, Berkshires, Durocs, etc., marked and colored in a particular way, unless they were convinced that all-around quality was secured by a close adherence to these points. Other traits being negligible, I would take a bright golden any da- rather than a three-bander. Too many of the best three-banded strains throw dark drones, and dark drones are anathema. The three bander has earned its present popularity through a reputation for being more constant in quality than other strains. I believe that where bright golden strains have been condemned this has occurred where the color was obtained by crossing with Cyprian blood, instead of being worked for by persistent selection of increased bands in the pure Italian.

Virginia.

HUBAM CLOVER

A subscriber in England sends a sample of sweet clover which grew from a sample of Hubam seed bought in this country. He states that local botanists identify it as **Melilotus alba** and wishes to know whether he has secured the true Hubam clover or the common **Melilotus alba.**

Apparently there has been much confusion among our European friends concerning the identity of this plant. Hubam clover is merely an annual form of the common sweet clover **(Melilotus alba)** and is very similar in all respects except that it is an annual instead of a biennial. If the plant blooms the first year our friends may be sure they have the true Hubam clover, while if it does not bloom until the second year it is the common sweet clover.

QUEEN BEE REGISTRY

By C. H. Smith

Apropos of a basic foundation for pure-bred stocks of bees, it is especially opportune, at this time, that a nation-wide drive be inaugurated looking toward the establishment of a registration or league of breeders of dependable, thoroughbred stock. This league or registry must list, in its membership, only those whose stocks are systematically and scientifically bred for the accentuation of **recognized,** desirable characteristics.

The critical period is upon us and immeasurable benefits will forthwith accrue. Education in scientific breeding will become recognized and considered as indispensable, among beemen, as it is today among the breeders of purebred farm stock, poultry, etc. Until this condition has been attained, we must not anticipate any lasting improvement in our stock.

Propaganda and honest advertisement will rapidly eliminate the scrubs and drive the F2 (second filial) generation from the markets. It is a recognized fact that the actual work of producing scrubs is as great as that of producing pure stocks.

The honey producer will make a drive for those larger harvests and put forth an effort to accomplish that which is obtained by those whose methods and stocks are honey-getters.

The co-operation of the state and national, agricultural departments, would produce lasting benefits. The various bulletins on breeding and allied subjects should be a boon to every progressive breeder.

A most necessary requisite would be the inauguration of an honest and dependable listing of all known pure stocks in the nation, or probably the entire world. An inspection of all commercial queen-breeding establishments (whose stocks are pure and disease free) placed under federal control, with requirements of qualification for registry, is obvious.

Until this can be done, the true breeders will have no incentive to give us the product of their best effort.

Ultimately, we must reach the point where we may select (as the stock man does) that strain or race of queens which we desire and be assured that we are getting just what we pay for.

The evolutionary stage will develop rapidly and prices will become consistent with the stock purchased.

Transportation and other affected departments will be much more readily reached when presented by a full registry than when approached by the individual.

This proposed league will have every opportunity of bringing home (to the honey producer) the all-important fact that the life and force of the colony is focused about the queen.

Simultaneous with the inauguration of the above scheme, and when the journals follow up with the advertisements of pure stocks, there will be found a much greater stimulus for breeding knowledge, and these same journals must then step in and do a little missionary work along breeding lines.

We realize that help is needed and ask your whole-hearted assistance in the establishment of some sure means of obtaining pure stocks of queen bees.

Niagara Falls, N. Y.

(Is this a dreamer's idea, or can we get to it by co-operation? It is a very fine dream, anyway.

The magazines published in the interest of beekeeping have already followed the custom requiring each queen breeder to give evidence of his good faith and ability to supply such queens as he advertises. If, in addition to this, the breeders themselves organize an association, they could eliminate the breeders of scrub stock. This elimination might cause dissatisfaction and lead to some abuses, but no improvements have ever been made without causing more or less abuse.

What do the breeders say?—Editor.)

INTRODUCING QUEENS

By A. N. Draper

I want to relate to you how we successfully introduced a valuable queen to a queenless colony.

On opening the hive, I found it was queenless with queen cells in various stages of development. After placing the cage containing the queen over the combs ,on thinking the matter over when I got home, I thought it best to enclose a comb of hatching brood in wire cloth. I cut out a 2 inch strip to nail on the top bar of the frame. Then I placed a small strip on each side of the bottom bar, wound wire cloth around the frame and tacked the end so as to make it bee-tight. I then bored a three-eighths hole through the bottom bar close to one end of the end bars and made a cork to fit same. Then I ran the queen and her escort through the said hole onto the hatching brood. At the time we ran it in, there were 75 bees hatched. When I got home, thinking over the proposition, I made up my mind to put a frame of eggs and brood in various stages of development on each side of the cage. Mr. Lewis returned in a few days, at which time he opened up the wired

cloth at one end of the frame, so as to leave a small aperture sufficient to allow the bees to enter one at a time and acquaint themselves with the queen.

A number of inspections during the past month have shown the queen to be laying very sucessfully.

A. N. Draper.

Virginia.

INTRODUCING QUEENS

By W. H. Lewis

About a year ago the editor asked for methods of late introduction of queens. I gave one which was by dropping the queen, covered with a little honey, into the hive between the frames. This was done with the thermometer at about 40 degrees and was successful; the same queen and the colony giving a good surplus the past season, but the editor, in a foot note says that I was lucky, "as this method is not always a success," which leads me to ask, what manipulation of the hive is "always a success?"

The late Dr. Miller once truthfully said, "Bees do nothing invariably by rule," so all practice in handling bees by the apiarist, "according to rule," must surely meet with some failures.

From the sentimental view it don't seem the proper way to use a queen, but if no injury is done, sentiment should not be considered.

Possibly it was because I did not give the honey method, in full, as I practice it, that there may have been too large a per cent of failures by others. After the queen is dropped into the hive, as much as 12 ounces of honey, for a strong colony, is poured in between the frames so as to cover the bees as much as possible. This extra dose of honey sets the bees to licking off each other and no particular attention is paid to the queen.

By the use of honey, as stated, colonies can be united, either single or two-story, nuclei or single combs from observation or exhibition cases, at any time in the fall, without the loss of a bee. There may possibly be failures, but not often. Uniting two colonies with a sheet of paper between sometimes fails.

Honey should not be used unless it is positively known to be free of diseases, or thoroughly boiled, and this is the greatest objection to introducing or uniting where honey is used. That is how I see it. And honey should never be used except in the evening, to prevent robbing.

But why not use the Arthur Miller smoke method of queen introduction? There is no surer way, if properly done. I have introduced as many as 50 queens in a season, at all times of the year without a single failure. Have many times introduced queens in the worst cases of laying workers for my neighbors, and never missed. The only thing necessary is to follow the directions carefully as given by Mr. Miller, particularly as regards the volume and kind of smoke, and always in the evening about dusk.

The Miller method of smoke introduction, although it seems to have been discarded, is the surest of any yet given to the public. If I had a hundred-dollar queen I'd smoke her in, in any colony, in preference to any other way.

Edmonds, B. C.

WILD BEES AS POLLENATORS

By O. A. Stevens

IN the September number of this journal Mr. Geo. W. Williams writes that there are nineteen genera of wild bees, but that they are not abundant in numbers and are of little importance in pollination. He does not mention the source of such information nor whether it applies to the United States or the entire world.

Popular knowledge of wild bees hardly goes beyond bumblebees, which are fairly well known, and a very vague notion of "sweat bees" which are about as likely to be flies. Many species of hover flies, beeflies and others are commonly mistaken for bees, so the per cent of wild bees which are well known is almost none.

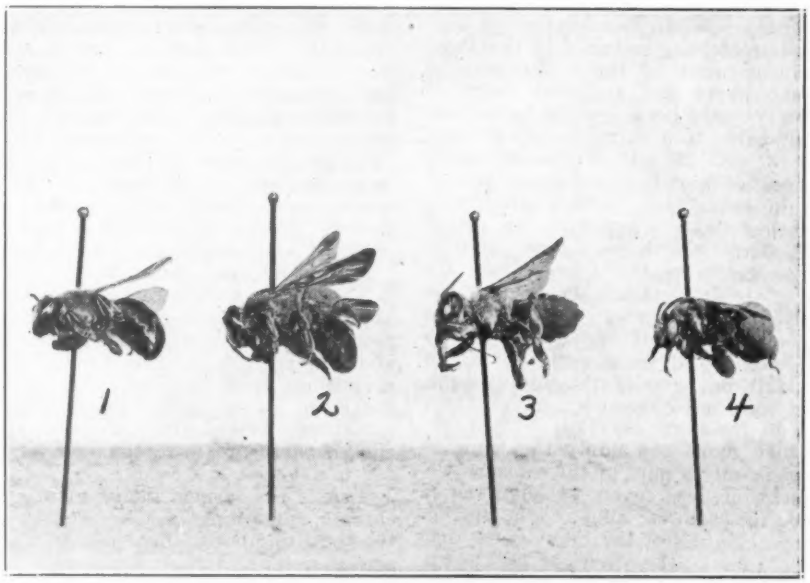
Dalla Torres' catalog of 1896 lists 135 genera and 5,700 species of bees for the entire world. Friese, in 1909, estimated the total number at 8,000 species. No recent complete list of North American species is available. Cresson's catalog of 1887 gives 16 genera of the so-called short-tongued bees and thirty-four of the long-tongued. Since that time the number of genera has increased greatly, although perhaps mostly by splitting up the old ones. The number of known species in North America has increased greatly, being now probably over 2,000, of which as many as 200 or 300 may be found in a single locality.

To be sure, the number of individuals is of more importance than the number of species, but it gives some suggestion as to their abundance. So long as the different kinds are not recognized nor distinguished from wasps and flies, we scarcely can expect much to be known of their numbers, either. A large field of one kind of plant certainly presents a condition new to the wild bees. I believe we know nothing about the extent they can or do respond to the situation by increasing in numbers. It is to be expected they would, to some extent at least, since animals of all sorts tend to increase when food supplies increase.

As a matter of fact, the life history of most of the wild bees is known quite imperfectly and it would be rash to draw conclusions at present as to their value as flower pollinators. One of the most nearly complete local lists is that of Connecticut, in which 230 species are listed. Several of these are specifically mentioned as important pollinators of the flowers of fruit plants. Many of the others are recorded as visiting such flowers.

During the past year Folsom has reported investigations in which two species of long-tongued bees (**Tetralonia dilecta** and **Melissodes bimaculata**) were found to be important pollinators of red clover in central Illinois. Bumblebees do not occur in Australia nor in South Africa. Franklin, in his monograph on the American species, quotes entomologists from these places as stating that they have an abundance of other long-tongued bees for clover pollination. Also that red clover seed is produced in the Transvaal and alfalfa seed in New South Wales.

Artificial introduction of bumblebees failed in Australia, but succeeded in New Zealand.



Honeybee compared with some common wild bees. 1. Honeybee. 2. A large *Andrena*. 3. *Megachile* (leaf cutter). 4. *Melissodes*. Note the long tongue of the leaf cutter and the load of pollen on its abdomen. Also the pollen on the tibia and basitarsus of the *Melissodes*; the *Andrena* has very little on the basitarsus, but much on the tibia and all over the body.

Observers in several widely separated districts have reported the efficiency or the leaf-cutter bees (**Megachile** spp.) in pollinating the flowers of alfalfa. In this plant the stamens are enclosed by the petals in such a manner that pollen is not exposed unless the floral mechanism is "tripped"' by the proper manner of visit. It has been noted by several observers that the honeybee does this only occasionally (less than one per cent of visits). The bumblebees are only partially efficient for the same reason, but the leaf-cutter trips the flower almost invariably.

Comparatively little careful investigation has been done along these lines and much of what has been published shows a lack of familiarity with the insects. Thus U. S. D. A. Bulletin 75, dealing with alfalfa pollination, reports only one species of leaf-cutter (**Megachile latimanus**), although several can be found at the flowers in practically any locality. The same bulletin reports that a species of **Andrena** had been observed tripping the flowers. Believing this to be rather improbable, I wrote to one of the authors inquiring "whether it was not possible that some other bee could have been mistaken for an **Andrena.**" The reply received was that "it was not possible, for the specimens had been identified by men who had been working with these insects for years." Considerable further correspondence, however, failed to find any record of the determination having been made by a specialist or of any specimens having been saved. Another bulletin (U. S. D. A. 844), reporting upon insects visiting sweet clover flowers, reported barely a dozen species of bees, a small fraction of what should have been obtained. Sweet clover flowers are visited by an unusually large variety of wild bees. On several occasions I have taken a dozen different species at sweet clover flowers in the course of a single day's general collecting, and as many as twenty different species in two successive days (no bumblebees included in this list).

On account of the differences of mouth parts and seasonal flight of different wild bees, certain kinds may be of value to a particular flower and others not at all. Those formerly classed as short-tongued are unable to obtain readily the nectar of alfalfa or other flowers requiring an extension of the mouth parts beyond 3mm. (one eighth inch). Bumblebees are found throughout the season, but the early ones are only the hibernated queens. Some of the other species also are found from early spring to late fall, but usually not equally common at all seasons (having two broods, for example).

Much more commonly the time of flight is only a part of the season, two months or less, even as short as a week in case of some early spring forms. None but the bumblebees are truly "social," the others being known as "solitary," each female making her own nest and providing for her young which number only about a dozen. The majority of them nest in the ground, digging their own tunnels or utilizing old holes of various kinds. Others hollow out pithy stems or use various natural cavities. A few construct quite original nests out of mortar, clay or resin.

Perhaps the following sketch of a few of the most common general will be of interest. Very few have received common names. This is probably because they are so little known. Those which have names are exceptional ones, possessing some peculiarity of outstanding interest. In describing sizes we may use a honeybee for comparison, "large" being distinctly larger than a honeybee; "medium," as large to half as large; "small" less than half.

The largest bee known is not a bumblebee, but one of the leaf-cutters found in the East Indies. It reaches a length of one and one-half inches. Some people may think they have seen bumblebees as large or larger than this, but the measurements given in Franklin's' monograph show the average size of the queens to be three fourths to seven-eighths of an inch, and only five of the forty-seven North American species reach one inch. One of South America and one of eastern Europe seem to reach about an inch and a quarter. I do not know whether any particular bee has been pronounced the smallest, but there are many which are hardly over an eighth of an inch long.

Halictus—Furrow Bees

The name "furrow bee," which has been suggested for these, refers to a dorsal groove on the last abdominal segment of the female. It is a good distinguishing character. The majority are small, greenish or brassy in color. Some are black, a few reach medium size and have the abdomen marked with banas of white hair. This is one of the largest genera, the species being numerous in all temperate and tropical parts of the world. These bees are found from early spring to late fall. So far as their habits are known the females hibernate. No males are found until midsummer. Their burrows are in colonies and some at least of the species are abundant. Fabre, the famous French student, of insects, reports one colony containing about 200,000 burrows. They are common visitors to flowers of fruit trees, small fruits and all sorts of flowers where the nectar is not so situated as to require a long tongue.

Andrena—Sand Bees

These are mostly of medium size, body usually black, the thorax commonly covered with dense hairs, the abdomen smooth or banded with hairs, sometimes well covered. The hairs are most often gray or ,yellowish sometimes bright red. Several species of these are mistaken frequently for honeybees.

This is the largest genus of all, including something like one-fourth of the total number of bee species. They are abundant in most temperate climates except South America and Australia. The greater number are spring and early summer bees, visiting flowers of willows, fruit trees, etc. A smaller group of species is distinctly autumnal, visiting sunflowers, asters, goldenrods, etc.

The name "sand bees" was suggested by a German entomologist who monographed the European species about forty years ago. They are said to prefer sandy soil, whereas **Halictus** commoniy nests in hard ground. They differ from **Halictus** also in that they do not nest in colonics, and both sexes fly during the same period.

These two genera comprise the bulk of the so-called short-tongued bees. One other peculiarity may be of use in distinguishing them from the others. The pollen is carried closer to the body, on the upper joints of the legs, or even on the body itself to a certain extent, and very little on the first joint of the foot, which is used so much by long-tongued bees.

There is a group of bees which are small in size, but have relatively longer mouth parts. These, or at least many of them, moisten the pollen when it is collected, as do the honeybee and bumblebees. The very interesting genus **Perdita,** with over 100 species in southwestern United States, belongs to this group. This raises another point in favor of flower pollination by wild bees. The honeybee combs the loose pollen from her body, moistening it into lumps on the hind tibiae and basitarsi, where it can be of no further value for pollination. Most of the wild bees collect their pollen dry and it has always a chance of being brushed upon the stigma of the flower. Anyone who has seen heavily-loaded females will appreciate the extent of this opportunity.

Melissodes—Long-Horned Bees

The males of **Melissodes** and several other closely related genera are easily recognized by the antennae which are about twice as long as those of the females. The females are medium sized or larger, relatively short and stout in form and quite hairy. The hind tibia and basitarsus (upper joint of foot) has an extremely well developed brush of hairs for pollen collection.

About 200 North American species are known. They are mostly summer and fall insects, most abundant in the Southern States. The females are very industrious workers. Two of these I have already mentioned as important pollinators of red clover. The species of **Tetralonia** seem to be spring and early summer forms and visit the flowers of many legumes. Curcurbita (squash, pumpkin, etc.), cotton, sunflowers, thistles and many other flowers are visited by the summer species. The mouth parts are as long or longer than those of the honeybee.

Several other genera somewhat similar to **Melissodes** lack the long antennae in the males. **Anthophora** has many species, especially in the western states. Some of them are quite large bees.

Megachile—Leaf-Cutters

The females of this group are readily known by the fact that the pollen is collected on the under side of the abdomen instead of on the legs. Most of the species are of medium size or larger, stout in form, usually black,

sometimes covered with hairs otherwise colored. The mandibles are unusually powerful.

This is one of the largest and most widely distributed genera. They are summer forms, most abundant in the warmer, drier regions. A comparatively recent monograph lists, in Europe and northern Asia, 190 species, North America 60, South America (including Mexico and Central America) 100, Africa 70, India (and part of East Indies) 60, Australia 50.

The name of these bees comes from their habit of cutting pieces of leaves to line their nests, as probably many of our readers know. Their mouth parts are long and their importance in connection with alfalfa has been discussed in the first part of this article. The other fairly important genera, and several smaller ones, are related to the leaf-cutters. The mason-bees **(Osmia)** have many species. They are usually bluish green in color and of various sizes. They are found in the north temperate zone and are spring flying. Some species of **Anthidium** are called "resin-bees," from the material used to construct their nests. They are known by the yellow spots or bands on the abdomen. The species seem to be especially numerous in central Asia, and probably are among the natural pollinators of alfalfa.

This concludes the survey of the more common and abundant forms, except the bumblebees and the parasitic sorts which are of less importance but quite numerous. The carpenter bees **(Xylocopa)** are large bumblebee-like insects, more common in tropical Asia and Africa, only one species being widely distributed in America.

A NEW YORKER COMES HOME

Since R. B. Willson is a native son, the beekeepers of New York State are to be congratulated on having one of their own home folks, with such a wide experience, to be the chief aid to them in their beekeeping problems. Wilson is a New Yorker throughout, but he has accumulated a far-reaching contact with the best beekeeping of other regions, all of which he has brought back home with him.

The Empire State has been particularly fortunate in the way its apicultural interests have prospered and it has been long a leader in this field. Under the able guidance of Rea, the tangled ends of beekeeping were brought together into an organized pattern. Beekeeping organi zations there are now completely unified and ready to accomplish real results.

Such is Willson's heritage, and we believe he is prepared for it. He is one of those youngsters of the race who were permitted experience in the great war as officers of rank. Previously he was trained in fundamental science and apiculture at Cornell, was a successful commercial beekeeper and then became one of Uncle Sam's extension men. His success has been conspicuous. We wish him well in his new work.—G. H. Cale.

R. B. Willson

OPEN AIR FEEDING TO PREVENT ROBBING

The "Bee World" is publishing articles upon queen rearing, by Mr. E. Penna, the noted queen breeder of Bologna, Italy. Most of our readers have read or heard of Mr. Penna, but we might remind those who preserve their files of the American Bee Journal that we gave a full description of Mr. Penna's apiaries and queen breeding at the time of our visit in Italy, for we spent a whole day with him. The account of our visit was given in the A. B. J. for January, 1915. That which makes the Penna methods and writings particularly interesting is that Mr. Penna is a man of wealth who does queen-rearing for a pastime, to keep himself busy, and not for the possible profit.

Well, in the August number of the Bee World, Mr. Penna describes his method of feeding in the open air, **to prevent robbing.** We are all accustomed to the idea that feeding induces robbing; but in the manner in which he does it, it actually prevents it. He writes:

"A feature mostly cared for in my queen rearing apiaries is the **open air feeding.** Having such a big number of nuclei and hives, in my chief apiary, it is quite necessary for me that my bees be kept always busy to avoid robbing and confusion. Any one who has some practice of queen-rearing or has visited some queen-rearing yards, knows well that a perfect tranquillity of the bees is necessary, not only to avoid trouble in opening and inspecting nuclei, but also for the mating of queens, when bees are whirling in the air or prowling around the nuclei, as is the case when robbing is up or when bees are attempting to rob, many queens are likely to be lost on account of that confusion, when returning home after their wedding flight. The best way to obtain and maintain a peaceful state of tranquillity whenever there is a dearth of nectar in the fields, is to feed outdoors.

"This kind of feeding being rather dangerous and difficult, should not be attempted by novices without a sound preparation and a great deal of prudence. In my queen-rearing yards, we feed sugared water in the proportion of 12 per cent of sugar, which we have found to be the most convenient in our case. The average quantity of sugared water consumed by bees in my chief apiary in dearth times is above 220 pounds in one day."

Mr. Penna goes on to say that this kind of feeding does not entirely prevent robbing, as a few drops of honey, if left where bees can get it, will immediately start active robbing. But it keeps the bees busy and the quantity of sweet is not great enough to cause that feverish activity that we see when bees manage to help themselves to pure honey, whether in a weak hive or by finding their way into the honey house.

Similarly, some of our beekeepers create an artificial flow which is of use in inducing the bees to breed during a dearth of nectar, and which is yet not sufficient to give them anything to store, or to cause robbing. In the October number of this Journal, for 1919, we gave, on page 336, an account of Mr. Ira D. Bartlett's method of inducing breeding. He mixes sugar with water in the proportion of one to seven, or almost a gallon of water to a pound of sugar. This compound is similar to nectar containing 86 per cent of water. It would not attract the bees, owing to the lack of odor of sugar, but they can be attracted to it, by placing a few old combs on the feed. Mr. Penna feeds in a well-arranged feeding shed, with jars apparently inverted, while Mr. Bartlett just puts the feed in tubs and covers the liquid with floats, to keep the bees from drowning.—C. P. D.

MARKETING HONEY

By S. W. Dyer

I have kept bees only since August of this year, but am a member of the local bee association and am wrapped in the delights of beekeeping as a hobby. But, after reading your reports on the prices of honey and your articles by various contributors on the marketing of honey, I am impressed with the fact that honey production is a money-losing game for many this year, and I am convinced that this is entirely unnecessary.

I read articles where the author states that he has developed local markets in towns of 2,000 to 10,000 population for his honey at 20c a pound in 5-pound tins. Others receive less than this and pride themselves with this accomplishment. But hundreds do not possess these local markets and must depend upon a dis-

tributor to dictate prices. And now follows my own idea:

There are millions of customers in the section of the country where I reside that don't buy honey and who would be happy at the opportunity of securing some of this delicious sweet at a price that would return the producer a profit, without too many middle men. Last winter I bought the only honey I could find and was forced to pay 28c for 8 ounces of extracted honey in glass. A friend had to pay 60c for 12 ounces. A beekeeper friend of mine sells what he can produce from mixed flowers at 50c a pound. Vermont comb honey sells for 45c and 50c now. The largest honey package in jars I have noticed this fall is a 9½-ounce one. Do you see one reason why so many people don't buy honey?

This fall a friend of mine and myself bought a case of New York State white clover at 12½ cents f. o. b. and it cost us 14¼c, express paid to our door. I have been dividing mine with relatives, but my friend sold his at 30c a pound to friends in 10-pound lots, and purchaser furnished the receptacle. He had to buy more for himself and refused many more orders, as he wouldn't be bothered with outside work.

My other reason for knowing that tons of honey could be sold here at a profitable price is that I never saw an exclusive honey ad in any of our papers, not over 5 per cent of our food retailers handle honey; there are no definite known brands and merchandizing methods practiced in selling other commodities are nonexistent.

The one-pound and three-pound glass containers, I believe, would be the most acceptable packages here and when accompanied by proper merchandising methods and consistent advertising and sold at 40c and $1, respectively, I am sure a market for 10 carloads could be found within 60 miles of my home this winter.

The people here seem to have gone crazy about chocolates at $1 and more a pound. Why not honey? I believe for the very reasons I have stated: the price is too high and the package too small; no one knows that anyone sells honey, and all honey is alike in that the brand idea is not capitalized.

If a beekeeper can develop a market in a small town in the west at 20c a pound in 6-pound tins working alone, what could not an association of beekeepers with an advertising and marketing campaign do in a section of millions within a 60 miles radius? I believe they could make their industry expand just as quickly as any of these other industries that have profited by coming into our markets and have followed out the course I have outlined.

To me, as I see and study conditions, there is no fallacy in my plan.

With best wishes for the producers and those who lend them a helping hand, I am

An Optimistic Embryo Beekeeper.

Massachusetts.

(Here is a man who believes as we do, that the principal fault with our beekeepers in selling honey, is improper distribution and lack of advertising. Those who bestir themselves usually get rid of their crops at paying prices.—Editor.)

Fraternal Beekeepers' Association

The Fraternal Beekeepers' Association closed its first annual session on November 4. This association was organized one year ago by a number of leading beekeepers of southern California.

The session lasted over two days and was largely attended by beemen from all sections of the southland.

The first day's session was taken up largely in the outlining of the present meeting by President Buchanan, of Glendale, and arranging the program which was to be carried out.

Tariff on Honey and Beeswax was outlined by Mr. Knabenshue, editor of the Western Honey Bee.

Standardization of Supplies was exploited by Mr. Emerson, in no uncertain language, standing very strong for a more uniform standard equipment, especially in hives, supers, frames, sections, etc., eliminating the manufacturing of many of the odd sizes, etc. A committee was appointed by the chairman to consider this matter and report at next session.

Mr. Henry Perkins gave a most interesting talk on the rearing of good queens.

The question of vitamines in honey was most attractively handled by Mrs. Boyden, who has recently joined the California colony of beekeepers.

Mr. Pierce, of the Boquet Canyon country, demonstrated the fact that he could ably handle the commissary department a la chef, as well as keep bees, and covered himself with glory, distributing sandwiches and hot coffee.

Several very interesting demonstrations of labor-saving devices were on exhibition.

Officers for the ensuing year are Mr. Geo. Emerson, President; Mr. A. B. Shaffner, Secretary.

The next annual meeting of the Association will be held on the first Friday and Saturday of 1923, at Exposition Park Assembly Rooms, Los Angeles, Calif.

O. W. Bercaw.

"Eat More" Propaganda in Australia

The Agricultural Gazette, of Sydney, Australia, is authority for the statement that the "Eat More" propaganda is being carried on on an extensive scale in Australia. Gooseberries, tomatoes, oranges, and apples are among the products that have been subjects of special advertising drives during the last year or two, and it is claimed by the National Federation of Fruit and Potato Traders' Association that within a week a distributing throughout the country poster picturing the virtues of gooseberries as a food at a time when this fruit was bringing a low figure the price had doubled. While within three days of the issue of a special orange poster setting out the efficiency of orange juice for combatting influenza the price went up from 13 shillings to 22 shillings a case.

The Australian fruit growers also distributed large posters 3 feet by 2 feet throughout England. These posters were attractively colored and headed "Eat More Apples." They claim that these posters were responsible for largely increased sales of fruit products.

BEE KEEPERS BY THE WAY

A Beekeeping Entomologist

Dr. R. L. Webster, of the North Dakota College of Agriculture, is one of the most enthusiastic beekeepers among the bug men. While a few men have been getting big crops of honey in North Dakota for a long time, the public never heard about it, and the general impression has been that bees could not be profitably kept there. Since Webster went to the college the public has had its attention called to the fact that North Dakota is one of the best states for honey production, and newspapers from one end of the country to another are carrying stories of bees or honey from the northern apiaries.

Webster was entomologist at the Iowa Experiment Station when the beekeeping work was organized there under his direction. Those who know him are looking for similar development of the beekeeping work at the North Dakota institution.

R. L. Webster

A CRYSTALLIZED CIVILIZATION

By the Rev. A. A. Evans

It is surprising how little we know of bees, considering the long period these creatures have been domesticated and utilized by man. In the dim pre-historic ages when man wandered chiefly as a hunter, with only skins of beasts as his clothing and the chipped flint as his weapon, sugar, as we now use that term, the sweet gift of the cane and beet root was unknown. Yet there is evidence that he not only sought out stores of wild bees in the crannies of rocks and the hollows of trees, but certainly early in the Neolithic stage, brought them within the circle of his possessions.

For twelve or fifteen thousand years man has kept bees, but it is only within comparatively recent times their ways, their nature, and the best methods of using them have been studied. Probably during the mediaeval period every cottager was a beekeeper, for sugar is one of the necessities of healthy life, and sugar of cane did not come into common use until the discovery of the New World.

A Blind Bee Student

It is one of the most remarkable facts of human history—at least I put it so—that the first close, really scientific investigation of bee life was caried out by a blind man, the Swiss student, Huber. His letters, full of charm in their intimate racy style, and well packed with information, first gave the outside world a real glimpse of the wonder and mystery of the hive interior. How he did it, handicapped with his affliction, groping in darkness, and yet with intellectual insight and enthusiasm, that must remain among the romances of the history of science.

A Stereotyped Existence

But since bees have been ever so faintly reported of, and written about, as in the treatises of Aristotle and the charming word pictures of Virgil, they have remained unchanged. They seem at a period, long before the advent of man on the earth, to have reached, groped their way by experience and experiments, to a certain high level of civilization, and then stood still. We can see the same, though in a much less degree, in human activities as, for instance, in the Chinese empire, which reached a high and very efficient pitch of culture and organization before even the Christian era; anticipating many modern discoveries of Western Europe, and then, satisfied with themselves, content with their high place, they drifted into stagnancy, and the blight of sterility settled on them, until recent years.

The Milestones of Their Journey

Among bees, wasps and ants we have a striking example, as Lord Avebury shows in his well-known book, of an early and apparently crystallized civilization. Creatures who seemed to have moved and developed along a highway, and each stage of this movement is before us in certain lowlier existing forms of the genus Apis (as the bumblebee, who is a hermit), the leaf-cutter, Mason bee and others in which the social sense and architectural powers are growing, and then reached what seems a **cul-de-sac.** "Bees and ants," says a well-known writer of today, "must have spent millenia in perfecting their organization; and now that they have reached a stable equalibrium, no more changes are perceptible." But the distinguished man who wrote that is not a beekeeper, and there are two queries which those who have long handled bees would raise. "Have they reached a perfect civilization? and are they changeless? Although bees have been "kept" for more than ten thousand years, we have only known them specifically for a hundred, yet evidence is accumulating of their power to initiate, make surprising departures, and to learn and act on new experiences. The bee world is not petrified by any means. It is only the unthinking who gaze at a hive interior and then talk of their wonderful "instinct."

Adaptation is Necesasry to Existence

Every animate creature is in contact with an ever changing world, and so is compelled, in order to live at all, to respond to new experiences. Fossilized things are dead things. So, in a faint yet true sense, every creature has a conscious experience, it is storing up impressions and utilizing them, and by these means adapting itself to ever fluctuating conditions of its life. Nothing lives peaceably except rock and stones. What people call instinct, though here we touch on a highly debated matter, is merely the garner of long experience, that of the individual and the race, which has passed into the sub-conscious. Actions repeated produce habit, and habit, hereditary habit, race habit becomes in long time automatic. This is at least one way of explaining an elusive feature of human, and all other forms of life.

Bees may seem to those of slight experience wooden and mechanical in their way of life. So undoubtedly in certain aspects they are. They seem not to have the fresh suppleness of resource we are acquainted with in some other creatures still mounting to greater efficiency. They move along tracks long found out, and the inevitableness of certain actions make them the unconscious instruments of the beemaster's purposes. He knows what they will do under given conditions, following along the grooves they once made in dim, far-away ages.

The Diverting of Instinct

But that is not all, every advanced and wise beekeeper finds out that the actions are not quite inevitable. That their instincts are not as sure and precise as the revolutions of a fly-wheel. Though instinct can never be eradicated it can be weakened and influenced by denying certain fields of its activity and fostering others. Early man, for instance, furthered in every way he could the swarming instinct of the bees, it was then his best means of obtaining honey. Today the opposite methods are at work in most modern apiaries. The swarming instinct is being retarded, because under new conditions it hinders honey getting. Even with the efforts extended over the short period of about fifty years we can see the difference in this respect between the Dutch bee with which swarming in Holland is still encouraged, and the old English or Italian which has been subjected for some time to new influences. This is only one instance to show that the bee has not reached absolute fixity. The domesticated bee in its manner of life is being moulded and shaped, and in a not distant future may become far more amenable to the purposes of the beemaster than it is at present.

England.

PRICE SPECIALS ON HONEY FOR LEADERS

By John T. Bartlett

A selling plan in which there may be a tip for others was followed this fall by the Foster Honey and Mercantile Co., of Boulder. The same concern has used the idea before. It shipped in from the western slope high grade potatoes, just as buying for storage was on among Boulder consumers. There are thrifty people everywhere who buy several hundred pounds of potatoes in the fall. The writer's observation is that the smaller or the more rural the place, the more extensively this is done. At any rate, Boulder people store a great many potatoes.

The Foster company used liberal newspaper space and advertised a special offer—a 5-lb. pail of honey free, with a hundred pounds of potatoes, at $1.75.

This strikes the writer as a good sales plan in more ways than one. For one thing, it gets honey into the homes of various buyers who might not otherwise buy it at all, or in that quantity. This is the aspect, in the writer's opinion, that honey producers should consider first in connection with all offers in which honey is used as a leader.

Thus Boulder is a place where price specials are made on honey every fall by various retailers. These retailers are advertisers who adhere to the policy of advertised "price" specials. The item on which a special price is put can be purchased at that price only for a week, maybe for a day. Afterwards, the store automatically goes back to the regular price.

One store, on several occasions, made a special of honey in a 10-lb. pail for $1. Another store advertised honey at 7 cents a pound, the customer to furnish the pail.

Taking a narrow view, the honey producer is likely to condemn such price specials. The proper view is that such special pricing is a splendid thing for the honey business, at the cost, not of producers, but of the retailer, who sells at no profit. Numerous instances have come to the writ-

er's atention of families which have bought a 5-pound pail when a pound had been their previous largest purchase, of others which bought 20 pounds, appealed to by the bargain price, when otherwise 10 pounds would have been their limit. There probably is no more effective method to get new people to try honey, and old users to buy it in larger quantities, than the price special. The price special, further, helps to move surplus and to achieve the desired balance between supply and demand.

There is a point in economics here which the writer believes every producer should thoroughly understand. A common opinion is that high retail prices are favorable to the producer, on the principle that "the higher the retail price, the higher the buying price." It is not unusual, also, for a producer who does some retailing himself to complain when prices on honey made by retailers are what he calls low.

Without considering the position of the latter individual (in passing we can observe that pricing of honey "too low" by retailers harms few producer-retailers), but with regard for the welfare of the honey industry as a whole, we find, on thorough study, that the thing which is most important about retail prices is the difference between the buying price and the retail price—otherwise the "spread." If it is narrow, the resulting favorable retail price stimulates consumption, and by so doing automatically operates to raise the buying price. If the spread is broad, a retail price too high restricts consumption, and operates to reduce the buying price.

Honey price spreads have had a habit of being much too wide for the producer's best interests. We can expect this condition to pass as the retail attitude toward honey ceases to be as toward a specialty and becomes a staple. Price specials on 5-pound and 10-pound pails for "leader" purposes, reflect a changing attitude, and are to be welcomed.

Colorado.

POLLENATION OF FRUIT BLOSSOMS

It is well known and has often been repeated that the insects, and especially the bees, are useful, and in fact indispensable, to the pollination and fructification of our fruit trees. But it is always a pleasure to find a confirmation of home experiments in foreign publications. So we gladly quote the "New Zealand Fruitgrower" on that subject, in its number for August 16, by H. S. Izard, Henderson, Aukland:

"How is the pollen to be transferred? There are three means of transference—wind, human agency, and insects. Human agency can be counted out in our commercial orchards, save for the purpose of experiments or the raising of new varieties. It is surprising to learn that the wind is a very poor hand at pollination, so much so that it can scarcely be considered as a means. This has been again and again proved by such eminent men as Chittenden, Waite, Blackhouse, etc. To give an example of one of their experiments: Two trees each of Jonathan and London (Five Crown) Pippin were covered up, one of each with cheesecloth and one of each with insect proof wire gauze. The result was that although all four trees were laden with blossoms, only one blossom set: at the same time and in the same row ten Jonathan trees and ten London Pippin trees, all adjoining the covered trees, all set and carried heavy crops of fruit. This proves two things. One that the wind is a very poor agent for pollination, and the other that as insects of all sorts were excluded from the covered-in trees, but had access to the other trees, it is to insects of various kinds that we must look for our main means of pollination. And of insects it has been proved in England that 80 per cent of the pollination of hardy fruits was done by hive bees, 15 per cent by various bumblebees and the remaining 5 per cent by other insects.

"The fruit grower cannot do without the aid of the hive bee; every orchard, no matter where situated, ought to have at least one hive in it, and, according to its extent, so should the number of hives be increased and distributed from one end of the orchard to the other. If we expect the bees to work for us, let us do all in our power to assist them in their work and at the same time benefit ourselves, by having healthy trees with healthy blossoms with their correct pollenizers handy. The bee naturally ranges a long way from her hive in search of pollen, even up to 2½ miles if she cannot get it nearer home; she does not believe in the go-slow policy, or 44 hours work per week, and only rests when compelled to by darkness or stress of weather. Now the blossoming period does not last long, and the pollination period is shorter still, so if boisterous, wet or cold weather intervenes, the seed of our fruit is poor because the bees have not been able to visit all the blossoms. But should even a brief period of calm or sunshine occur, out will come the bees and set to work on the nearest blossoms, and it stands to reason that if your hives are handy to healthy blossoms with their correct pollenizers close by, that the set of your fruit will be far better than if you had to rely on bees who had to journey a long distance to pollinate your blossoms."

THE EDITOR'S ANSWERS

When stamp is enclosed, the editor will answer questions by mail. Since we have far more questions than we can print in the space available, several nonths sometimes elapse before answers appear.

Wintering

Dear Mr. Dadant:—Please refer to page 518, November American Bee Journal, under " ause of Winter Loss," by "Idaho."

In your answer to this question did you not overlook the statement in the question, showing that *metal tops* were used? Also that the combs are often *mouldy?* Might it not be from the condensation of moisture, due to the metal tops? I have sometimes noted drops of water under the inner cover, after a very cold spell, among my own bees.

The correction of this would be to place an empty super over the inner cover, with a cloth over the escape hole, fill with packing, and then cover. Then treat as "Idaho" ordinarily does. Am I wrong in this?

Of course, I do not have as severe weather, ordinarily as "Idaho" does, but I study all these questions, and think them over. "Idaho" has probably a rather dry climate, when with cold weather and a cold surface to cause condensation, together with possible poor winter feed and long confinement, causing the bees to overheat the air would get water-bound at that temperature. The result would be condensation, dampness, some dysentery with resulting loss of bee energy and bees. Absorbents above might save this.

Please excuse my questioning your answer, but I was not satisfied with it, and you ended with Dr. Miller's "I don't know."

TEXAS

Answer.—I believe you are right. We use metal tops to our covers ourselves, but use absorbents in the upper story, always, and for that reason have no trouble due to the metal tops. Idaho is very much colder than any part of Texas, as I understand, and if water condenses in the hives in Texas, it is sure to do so in Idaho.

Honey Vinegar

Do you think that the acid in honey that has fermented or turned into vinegar would affect metal detrimentally in any way? As I understand it, the acid in fermented honey or honey vinegar, is different from the acid in apple cider vinegar I believe honey in almost its every form, is a preservative, and does not injure anything in which it is stored. I refer, of course, to metal storing tanks or receptacles.

WASHINGTON.

Answer.—Yes, I believe the acetic acid, whether from honey or from cider fermentation, will likewise attack metal. However, I am not a chemist, neither have I positive proof of this. There may be a difference, but it does not look plausible to me.

However, there is no doubt that the small quantity of acid existing in honey is not injurious to tin, when the honey is unfermented. I have kept the same honey in tin pails for four or five years consecutively, and the pail was just as bright after that time, in all the parts covered with honey as if it had been empty, while sugar syrup will rust tin vessels in a very short time. The only part of a metal vessel that will rust when containing honey is the part where the tin has been cut and the iron sheet under the tin exposed. There the metal will rust promptly.

Smoker Fuel

Please advise what is the best thing to smoke the bees with. ILLINOIS.

Answer.—When I first used a bee smoker, the housekeepers always kept a fire in the cook stove, so I would go to the stove, get a few hot coals into the bottom of the smoker-barrel and pile on them any sort of dry wood, from the yard where the bees are kept. There are always some branches on the ground, whether it is a grove or an orchard. No other material needs to be prepared when you have a good

fire to start with.

Rotten wood is recommende by some people, but it has the fault of making too many sparks, which fly out when using the smoker and irritate the bees. Pine wood goes out too readily. Hard wood shavings are very good, especially if they have been dipped in a solution of saltpeter. Dr. Miller used to keep a solution of saltpeter at hand. Some people dip the shavings lightly in coal oil, so they get afire easily. Old sacks or old rags, rolled up and dipped in saltpeter are very good, but they also make a lot of sparks. Discarded hive quilts that are covered with propolis are excellent, but they have the fault of giving too pleasant an odor of bee products, and attract robbers. Some people use just a big pipe with tobacco. This is especially a German custom, used also in Western Switzerland .

Greasy waste is good, but it makes such a stinking smoke that it is apt to taint the honey.

Dadant Hive for Comb Honey—Dark Honey

1.—I have 20 hives of bees in Dadant hives with 6⅝ extracting supers. I have quite a call for comb honey in pound boxes. Would it be advisable to use a super, say containing 4x5x1⅞ pound boxes over these hives? Have they ever been tried out? Or would you recommend a 10-frame hive of Langstroth dimensions for comb honey?

I find your papers very interesting and more instructive; would not want to part with mine. I subscribed through the New Hampshire Beekeepers' Association a year ago, and hope all members availed themselves of the opportunity.

2.— It has been a very wet season here and a good deal of the honey has been dark colored. Would it be due to rain? The first bloom honey was light and a fine flavor, before the rains came on. NEW HAMPSHIRE.

Answers.—1. Yes, you can use the 4x5 sections in a super in the Dadant hive, though the hive is especially intended for extracted honey But in using the large deep-frame hives, men of the east, like Quinby, Hetherington, Elwood and others , always take pains to reduce the brood chamber to its narrowest possible scope, because bees are likely to crowd the honey around in the brood comb though they will do it less with full sheets of foundation in the sections than they used to do it in Quinby's time. You may even use a super for regular 4¼ sections, fitting slats over the brood combs where the super is too short. You can sooner or later train your customers to use extracted honey and you will find it much more profitable.

2. The wet season does not cause dark honey; it is the blossoms which the bees find that cause the difference in color. There is, however, a slight difference in the color of honey from one year to another, but we are not at all sure that the wet or dry weather has anything to do with it.

Propolis—Escapes

1. Noticing bees flying about wet paint, I conceived the idea of furnishing them with artificial propolis, but I find that commercial varnish has a disagreeable odor and bees will not go near it. Later I made a propolis that looked very good to me by melting equal parts of pure rosin and linseed oil together, but the bees do not notice this, either. Do you think I could save the bees any work by painting the inside of the hive and the outside frames with this mixture?

2. Do you know of any successful artificial propolis?

3. Are any of the commercial bee escapes large enough to permit the passage of a queen? KANSAS.

Answers.—1. Wet paint attracts bees when they are not getting anything in the fields; but I don't think there is anything in it that they want. It is one of the artificial things that human beings make which bees are not likely to find in nature. I do not believe there would be any gain by painting the inside of hives. But painting the outside, before putting bees in will save the lumber of which they are made.

2. I do not know of any artificial propolis; but if there are any cottonwood trees, or poplars, in your vicinity, they should find all they want. Perhaps if you were to mix beeswax and rosin you could produce something that they would like. I do not believe it necessary.

3. Commercial bee escapes are intended to permit the queens, as well as the bees, to escape. But it is rather uncommon for a queen to leave the upper story through an escape, unless she is driven by smoke, and then it would be difficult for her to find the opening. Queens usually lay eggs where they are, in average seasons, and they do not go around much. Bees and queen also dislike to leave the brood.

Feeding for Honey

1. If a colony (strong colony) was fed 50 pounds of granulated sugar, how much of this could you extract?

2. Would this honey excel sugar in baking? If so, to what extent? CALIFORNIA.

Answers.—1. The amount of sugar syrup you would get in return would depend upon a number of factors. The bees would use a part of it to rear brood, a part for their own food, and a part for making wax, for bees always build more or less comb when harvesting sweets. So the amount used in this would be as irregular as would be the proportion of honey required in wax making. This is as irregular as the proportion of grass consumed in producing milk, or in transforming food into fat. If you were very successful you might get half of the amount fed, but it would be more likely to average about one-fourth. We have often heard of people getting rich by feeding sugar syrup to bees to produce a sweet that they could sell as honey, but have never been able to find anyone who succeeded. Personally, we hate to feed in time of scarcity, as there is always annoyance from robbing.

2. We do not believe that this product would be of any greater value than syrup made of sugar for baking or other purposes. Some of the sugar would be inverted, but the flavor would be but little changed.

Candy for Winter Feed

In the issue of September last, page 421, you recommend fondant for winter feeding, but do not give your recipe. As I have not been sucessful in trying to make hard candy and have not been satisfied with substitutes which I tried, I would thank you for definite instructions for making fondant your way. INDIANA.

Answer.—To make candy or "fondant" for bee food, add water to sugar and boil slowly until the water is evaporated. Stir constantly, so that it will not burn. To know when it is done, dip your finger first in cold water and then in the syrup. If what adheres is brittle to the teeth, it is boiled enough. Pour into shallow pans, a little greased, and when cold break into pieces suitable size. If not cooked enough it will be soft, if cooked too much it will be too hard. It takes a little practice. Try your hand on a small quantity. Or, if you have a young lady who knows how to make "fudge," let her teach you.

Package Bees

Would it be all right to buy package bees in the spring and put them into a hive with sheets of comb foundation, if I get them during the early fruit bloom? MINNESOTA.

Answer.—If you get those bees during fruit bloom and the weather is favorable, they may gather enough to breed and work out the sheets of foundation so as to store honey in them. But you must bear in mind that a colony composed of, say 2 pounds of bees and a queen, must rear brood, and that the first bees of that brood will not be fit for the field until 35 days after the beginning of the laying. So these bees must keep the hive supplied during that entire time. If the weather is warm and favorable, they may succeed in it. But they need constant watching and, in case of shortage, must be fed. I would prefer to have at least a couple of combs already built to give them when they arrive, so the queen may go to laying at once.

Building up colonies of bees by the pound requires constant vigilance, if we wish to succeed.

Salicylic Acid in Syrup

Kindly inform me what quantity of salicylic acid one should use to stop sugar syrup from granulating, and what would be the largest quantity one could use in order not to make it poisonous. MINNESOTA.

Answer.—We do not advise the use of salicylic acid in sugar syrup to keep it from granulating, because cream of tartar, or tartaric acid is better and less injurious.

I do not know just how much acid would be poisonous, but the recommendation of the U. S. Dispensatory is not to use it in anything that is prepared for human food. It reports that "a commission appointed by the French Government stated that the prolonged use of even a small quantity is dangerous, especially to aged persons." Of course, the bees may not be hurt as readily as human beings. But as long as we know that tartaric acid will act to keep the suga from granulating, we had better use it.

The A B C Bee Culture advises the use of a teaspoonful of tartaric acid for every 20 pounds of sugar. In our November, 1922, number, Mr. W. P. Brenner, page 519, advises the use of 10 teaspoonfuls of cream of tartar in 800 pounds of sugar, which would be one teaspoonful for every 80 pounds. So the A B C dose is undoubtedly ample.

If you try salicylic acid, do not use a greater quantity than a teaspoonful for 40 pounds of sugar.

Lumber for Hives

Would good, clear hemlock lumber make good beehives, if well painted?

Are hives made of hemlock as warm as pine?

Do bees do as well?

If not good for hives, give reason. I have some nice lumber logs that would make some 12-inch boards. NEW YORK.

Answer.—My impression concerning hemlock was unfavorable. I made enquiries from men who have handled it and find that hemlock rots easily, warps rapidly, and soaks water much more than any other soft wood of similar texture. It might be possible to coat hemlock with paint to such an extent as to preclude these defects, but I believe that if I had the hemlock I would use it to make dimension lumber for inside work, where it would neither soak nor warp.

The best lumber for beehives is undoubtedly white pine. But cypress is an excellent wood for bottom boards and for all the parts that are exposed to the weather.

Snow-covered Hives

I wish to ask about beehives being snowed under. About how long is it safe to leave hives completely snowed under in the winter? Or is there any danger of the bees smothering at all? I have followed the plan of opening the entrances shortly after each storm. SOUTH DAKOTA.

Answer.—If the snow is fluffy, there is not the least danger. Even when it is packed quite closely there is a probability that the bees will get sufficient air through it for a time. But when either the warmth of the colony or the outside air causes it to melt and freeze again,

it is ice and not snow which closes the bees in and then the danger of their smothering is great. But my personal experience indicates that bees rarely smother under the snow. The greatest danger is in their being held in during warm days. Your opening of the entrances shortly after storms is all right, provided you do not disturb the bees. I would just as soon have my bees entirely snowed under during the coldest weather as to have them uncovered. But when a thaw comes, we should look to it that no melting snow gets into the hives.

Wintering

I live in southern Nebraska and I plan to winter my bees by wrapping the hives with about one inch thickness of newspapers and placing over them a telescope hive. Would this be sufficient in this part of Nebraska?

Answer.— Yes, that will be a very good protection, but you must leave the entrances open, through some sort of tunnel, or else you must remove the telescope hive whenever the weather is warm enough for the bees to fly. Otherwise, they would probably get restless in warm weather.

ODDS AND ENDS

Grizzly Bear Breaks Up Furniture

A newspaper report from Montana gives us the information that a grizzly bear recently broke into the large kitchen of the mammoth Many Glaciers hotel in order to secure some of the honey sweets stored therein. The damage done incident to the breaking in and the tearing up of furniture and kitchenware amounted to almost $3,000 before the bear was finally disposed of by the watchman.

Bees Show Profit in North Dakota

According to newspaper reports, Dr. R. L. Webster, entomologist at the College Experiment Station in North Dakota, is said to have secured $125 worth of honey this past season from $20 invested in bees bought by parcel post from the South earlier in the season. This, of course, does not count in the cost of hives and equipment but does show a nice profit from the bees, and also the possibilities of beekeeping in some of the yet undeveloped sections of the United States.

Fruit Growers Demand Bee Inspector

The fruit growers around Yuba City, Calif., have requested County Horticultural Commissioner H. P. Stabler to try to get a bee inspector for their county and also to get a more liberal distribution of bees throughout the county for pollination of fruit.

Floods in Florida

"The Packer" is authority for the statement that the Florida everglades are experiencing exceedingly high water at present. Lake Okeechobee is now 60 miles long and 40 miles wide, instead of 40 miles long and 36 miles wide, as at low water.

There has been heavy loss to vegetable growers and market gardeners in this section, and no doubt beekeepers have suffered also, although most apiaries in that part of Florida are located on high platforms. We have yet to hear of beekeeping losses from high water, although there may be some.

Car Distribution is Poor

An effort is being made by fruit growers of the Northwest to have the Interstate Commerce Commission distribute cars for perishable crops, beginning next year. The northwestern fruit growers have suffered large losses, as have the grape growers of California, through inability to get cars in time to move their crops. In fact, rains in California have caught many of the grapes unharvested and have meant loss of at least 5,000 cars from this cause.

Save Your Beeswax

Bulletin No. 24, November, 1922, of the Dominion Experimental Farms entitled "Seasonal Hints," has as one of its subjects the rendering of beeswax. Beekeepers are urged to save every small bit of comb and every particle of wax and cappings possible, since beeswax has a high value. The article gives description of rendering beeswax and recommends besides the ordinary solar extractor a small size wax press such as is offered by supply dealers. The recommendations are wise.

Bees in British Columbia

The Experimental Station at Summerland, B. C., has been carrying on some experiments with bees since the fall of 1920. Their recommendation is that the bees be kept in Kootenay hive cases in order to secure best winter protection.

According to the experiment the hive cases are not only good for winter protection but they keep the colonies cooler in summer and are advised for the year round.

Beekeeping on Experimental Farms in Canada

The report of E. S. Archibald, the Director of the Department of Agriculture for Canada, for the year ending March 31, 1922, shows that bees were kept at several experimental farms throughout Canada. Those specifically mentioned are Ste. Anne de la Pocatiere, Quebec, Lethbridge, Alta. and Kentville, Nova Scotia. This, of course, is in addition to a large number of experimental apiaries in Manitoba, Ontario, and Quebec. These hives are usually kept in connection with the Horticultural Experimental Stations, the two being run hand in hand.

Bulletin on Acarine Disease

We have before us copy of an address of the President of the Apis Club, Dr. John Rennie, entitled "The Crucial Problem of British Beekeeping." The booklet contains 8 pages, is devoted to a discussion of the acarine disease, as well as the other problems concerning the beekeeper. We expect to secure a number of additional copies of this small bulletin, which we will send free on request, to our subscribers .

George W. York Edits a Bee Paper

We have before us the first copy of the bee magazine entitled "York's Bees and Honey." Mr. Geo. W. York has secured the California magazine entitled "Bees and Honey," which was formerly edited by Mr. Cary W. Hartman. Mr. York has changed the name as above, and expects to issue this publication monthly. The October-November number, which is the first number under the new editor, contains 16 pages devoted to editorial matter, contributed articles and reprints from other papers, news items, etc. We wish him success.

Apicultural School in New South Wales

The Agricultural Gazette, of Sydney, N. S. W., makes mention of the school in apiculture to be conducted at Hawkesbury Agricultural College from January 3 to January 20, 1923. The school given last year was such a success that it is to be repeated this year.

Honey Week

Salem, Oregon, recently observed "Honey Week" with special displays in the local store windows and with honey on the menu of the noon luncheon of the Chamber of Commerce. The object was to increase public interest in the best of sweets. Western newspapers gave considerable space to the event.

Montreal Beekeepers

The Montreal District Association is planning to hold meetings regularly once a month throughout the fall and winter. The first one of the fall meetings was held at Macdonald College, St. Anne de Bellevue, and took the form of a field meet. This was followed, a month later, by the first of the indoor sessions, on the 10th of November, when nearly 40 beekeepers gathered at the Mechanics' Institute in Montreal. The address of the evening was given by Mr. C. B. Gooderham, Dominion Apiarist, who took for his subject "The Two queen System," as developed a few years ago by the late F. W. L. Sladen, and since slightly altered and amplified by Mr. Gooderham and his asistants at the Dominion Experimental Farms.

The meeting was presided over by the President, Dr. T. P. Shaw, who anounced that the next meeting would be held in the Mechanics' Institute on December 15, when Dr. A. W. Maitland will give an address on "The Jumbo Hive; Its Advantages and Disadvantages." All interested in beekeeping are invited to be there promptly at 8 p. m., where they will be heartily welcome.

R. B. Ross, Jr., Secretary.
Westmount, Quebec.

Indiana Short Course

There will be a short course for beekeepers at Purdue University, Lafayette, Ind., from January 29 to February 1. Phillips and Demuth, together with Dr. H. F. Wilson and C. O. Yost and W. A. Price, will give the lectures.

WILL THE ALFALFA WEEVIL RUIN IDAHO'S BEE INDUSTRY?

By Don B. Whelan

Ever since the practice of spraying the alfalfa for the control of the alfalfa weevil started there has been more or less complaint from the beekeeper. Many a tale has been told of how the apiarist has had to move from the alfalfa weevil region because of this practice of spraying. In the Boise-Fayette Valley of southwestern Idaho, more than one beekeeper is reported to have left the state and to have gone to neighboring states where this pest and this practice is not found. Some have moved to Oregon, some to Wyoming and still others to uninfested parts of Idaho. The beekeepers say that it is bad enough, from their standpoint, to have his fruit trees sprayed, but when it comes to treating the alfalfa in the same manner, it will prove to be the straw that breaks the back of the bee industry.

Fundamental Facts

In a question as serious as this appears to be it is well to get down to the fundamental facts. In order to do this two questions must be answered: First, what is the relation of the alfalfa weevil to the alfalfa plant? Second, does the poison get into the flowers where the bees have access to it?

A brief mention of the weevil's habits will answer the first question. After spending the winter around the crown of the plant or in some other sheltered place, the adult weevil comes forth as the spring sun warms it up and, after mating, lays its eggs. These are at first laid in the small dry grass stems and later in the stems of the alfalfa itself. As soon as hatching takes place the tiny footless worms ascend the plant to the terminal buds and feed upon the unfolding leaves and undeveloped blossoms. When the infestation is bad the green chlorophyl is eaten from all of the upper leaves and buds, leaving just the skeleton of the leaves which turn a light gray or silvery color and are easily reduced to a powder when rubbed between the hands. In a field under these conditions there will be very few, if any, blossoms. With no blossoms present, the field is of no attraction to the beekeeper or to the bee. Likewise it is of little use to the dairyman or to the farmer. If that field had been sprayed, as recommended, with calcium arsenate at the rate of two pounds to the acre, it would have been a different story. If the spray had been applied at the time when the upper leaves showed the injury, most of the larvæ would have been killed and the alfalfa would have put on a new growth. In a field near Weiser, where the extension division put on a weevil control demonstration the sprayed portion of the field put on a growth of four or five inches before cutting time. Usually the unsprayed portion of the field looks as if it had been visited by a blight. The sprayed alfalfa puts forth more growth, but blooms to its fullest. Here is a feast that makes the beekeeper and the farmer smile, while the honeybee doesn't participate in an eight-hour day. The sprayed hay tastes a lot better to old Dobbin and to the family cow than the dried-up leaves and stems where no spray was applied.

Does the spray get into the flowers where the bees have access to it? In answering this second question we must know when the spray is applied. If it is put on when the blossoms are in full bloom, then there is surely cause for alarm. The authorities recommend that the spray be applied about ten days before the hay is cut, and the hay is cut just as it commences to bloom. If the alfalfa is to be left for seed ,then they recommend two sprayings, the first to be applied when the damage is first noticed and the second about ten days before the blooms start to open. In no case is it desired to spray during bloom. If there is an abundance of bloom there are probably not enough weevil present to make spraying worth while. In localities where the weevil are abundant the man who

THE BEE WORLD

Monthly Magazine World-Wide in Scope

The world's foremost educators, writers and scientists in beekeeping are contributors to the "Bee World," monthly magazine published in England.

Its subscription price is $2.50 a year.

By special arrangement we will handle and expedite all yearly subscriptions to this valuable magazine sent to us

We recommend it as desirable

AMERICAN BEE JOURNAL, Hamilton, Ill.

PACKAGE BEES FOR 1923

THREE-BAND ITALIANS ONLY. BRED FOR BUSINESS

A 2-pound package of the Yancey Hustlers, with a select untested queen, for $5.00; 25 or more, $4.75 each. Attractive prices on large lots. One-fifth cash books your order. Safe arrival and satisfaction guaranteed on every package and queen shipped. Orders are now coming in for spring delivery. Better send in yours and make sure of shipping date. We do not accept more orders than we can fill promptly.

CANEY VALLEY APIARIES, Bay City, Texas

YANCEY BROS., OWNERS

BEEKEEPERS WE MANUFACTURE DOVETAILED HIVES, HOFFMAN FRAMES, SECTIONS AND SHIPPING CASES

Our hives are made of best grade White Pine, cut accurate and smooth to standard measure. Sections are made of Basswood polished on both sides. There are no better made.

We carry a complete line of everything used in the apiary. Our shipping facilities are as good as can be found anywhere. We want your business. We guarantee prompt and satisfactory service. Price list free.

MARSHFIELD MANUFACTURING COMPANY, Marshfield, Wis.

GOLDEN ITALIAN QUEENS

	Nov. 1 to July 1			July 1 to Nov. 1		
	1	6	12	1	6	12
Untested	$2.00	$ 9.00	$17.00	$1 50	$ 8.00	$14.50
Select Untested	2.25	10.50	18.00	2.00	9.50	16.00
Tested	3.00	16.50	30.00	2.50	12.00	22.00
Select Tested	3.50	19.50	36.00	3.00	16.50	30.00

BREEDERS $12.50 TO $25.00

Queens for export will be carefully packed in long distance cages, but safe delivery is not guaranteed

NO NUCLEI, FULL COLONIES OR POUND PACKAGES

BEN G. DAVIS, Spring Hill, Tenn.

does not spray will have very few blossoms. This cuts this source of nectar off from the bees. On the other hand, the man who does spray will have an abundance of blossoms, while the added supers in the nearby beeyards will disprove the contention that spraying the alfalfa for the weevil is ruining Idaho's bee industry.

University of Idaho.

25,000 MEMBERS FOR THE AMERICAN HONEY PRODUCERS' LEAGUE

Co-operative Beekeeping

One dollar brings five dollars' worth of service. The beekeepers of America are continually calling for co-operation and we now have before us the greatest opportunity ever offered for real co-operation. The American Honey Producers' League is progressing rapidly. Sufficient funds have been provided for carrying on a limited amount of work and we can promise every beekeeper who joins the League five dollars' worth of service for the coming year for the one dollar membership fee.

If 25,000 beekeepers will pay in one dollar membership fee, we can promise even a greater service. We can also save the greatest co-operative beekeeping organization in existence. With this communication we are asking 25,000 beekeepers in America to help this co-operative movement. Here is what $25,000 will do:

1. Provide a paid secretary, who will keep the League members in touch with the market situation and the distribution of honey, develop a national advertising poster for the League members, develop standard grades and packages and individual service to such member.
2. Provide a national advertising campaign--$10,000.
3. Provide a monthly issue of the League Bulletin, which will keep members in touch with important matters of today.

Send your membership fee to the secretary of your State Association at once. If your State Association is not affiliated with the League, see that it does affiliate at your next meeting.

H. F. Wilson,
President.

PICK WINNERS

for your honey crop—their cost is usually no more. A card will bring circular and price list of our queens, our package bees and our nuclei.

R. V. STEARNS,
Brady, Texas.

WESTERN BEEKEEPERS!

We handle the finest line of bee supplies. Send for our 1922 price list. Our quotations will interest you.
The Colorado Honey Producers' Association, 1424 Market St., Denver, Colo.

The Bee World

The leading bee journal in Britain, and the only international bee review in existence. It is read, re-read and treasured. Will it not appeal to you?

Specimen copy free from the publishers: The Apis Club, Benson, Oxon, England.

Send us a post card today. It is well worth your little trouble.

PACKAGE BEES, QUEENS AND NUCLEI

DOLLAR A POUND

Queens accompanying, $1 additional.
Nuclei, 2-frame ----------$3.00
Nuclei, 3-frame ----------$4.00
Either Standard or Jumbo Langstroth

Queens, untested, $1; tested, $1.50. Breeders, $5.00, $10.00, $15.00.

These low prices are made in consideration that orders are booked early, so that we may prepare for them in the winter. Send for circular.

Loveitt Honey Co.
602 N. 9th Ave., Phoenix, Ariz.

Paint Without Oil

REMARKABLE DISCOVERY THAT CUTS DOWN THE COST OF PAINT SEVENTY-FIVE PER CENT.

A Free Trial Package is Mailed to Everyone Who Writes.

A. L. Rice, a prominent manufacturer of Adams, N. Y., discovered a process of making a new kind of paint without the use of oil. He named it Powdrpaint. It comes in the form of a dry powder, and all that is required is cold water, to make a paint weather proof, fire proof, sanitary and durable for outside or inside painting. It is the cement principle applied to paint. It adheres to any surface, wood, stone or brick, spreads and looks like oil paint and costs about one-fourth as much.

Write to A. L. Rice, Inc., Manufacturers, 23 North St., Adams, N. Y., and a trial package will be mailed to you, also color card and full information showing you how you can save a good many dollars. Write today

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BROOKSIDE APIARIES
Bennington, Neb.

QUEENS
Three-band Italians

PACKAGE BEES

QUEENS
Silver Gray Carniolans

Western headquarters for PACKAGE BEES and RELIABLE QUEENS. Order now for spring delivery. Shipping season for PACKAGE BEES starts April 1, closes July 1; Queens April 1 to October 1. A small deposit reserves your shipping date.

Young bees, every one from a clean colony, with no honey used in shipping cages, also County Inspector's Certificate of bill of health with each shipment I guarantee. Write for circular and prices, stating quantity desired and date of delivery.

J. E. WING, SAN JOSE, CAL.
155 SCHIELE AVE.

Nebraska Meeting

The sixth annual meeting of the Nebraska Honey Producers' Association, will be held at Lincoln on January 2, 1923.

Michigan Association Meeting in January

The meeting of the Michigan State Beekeepers' Association will be held in Engineering Hall, Michigan Agricultural College, East Lansing, Mich., on January 30 and 31.

Members expecting to attend this meeting can get a round trip ticket for one and one-half fare if they apply to their station agent and sign proper blanks.

Russell H. Kelty,
Secretary-Treasurer.

The League Convention

The National Honey Producers' League will meet in St. Louis February 6, 7 and 8, 1923. In addition to the business sessions, there will be an old-time program of popular talks on beekeeping subjects. There will also be a banquet and a visit to the Missouri Botanical Gardens. Headquarters will be at Hotel Statler.

What is a Scrub Queen?

This is a question often causing much discussion. It is usual to regard a queen by the amount of honey which her bees produce. If the colony is a large producer the queen is regarded as an excellent one. However, for breeding purposes, such a queen may be entirely worthless. It is more in line with breeding principles to judge a queen from her daughters or from her immediate antecedents. If her antecedents are of poor quality or her daughters do not prove as prolific as she, the queen is worthless for breeding purposes.

Queens Package Bees for the Season of 1923

Mr. Beekeeper: If you want the best quality that is possible to produce, at the lowest price possible to produce, here is the place to buy your queens and bees. I positively guarantee that NO BETTER BEES CAN BE BOUGHT, NO MATTER WHERE YOU BUY THEM. When you order a tested queen or a selected untested queen from me I don't go out in the yard and cage the first thing I come to, like 50 per cent of the queen breeders do. I send out what I advertise; every queen or package must give satisfaction. Now is the time to place your order for spring delivery. Note my prices; if you can buy better bees for less money I would like to hear from you. One-fourth down with order, balance before shippping date.

PRICES—QUEENS

	1	6	12	100
Untested	$ .95	$ 5.50	$10.00	$70.00
Select untested	1.10	6.50	12.00	80.00
Tested	2.50	12.50	24.00	175.00

POUND PACKAGES WITH SELECTED UNTESTED QUEENS

1-pound packages, 1 to 12, $3 each; 12 to 50, $2.90 each

2-pound packages, 1 to 12, $4.50 each; 12 to 50, $4.40 each. 3-pound packages, 1 to 12, $5.50 each; 12 to 50, $5.40 each.

Shipment will be made on date specified. Prompt service and satisfied customers a specialty.

THE FARMER APIARIES, Ramer, Alabama

Annual Sweet Clover Seed for Sale at Low Prices

PLANT IT FOR THE BEES.

We have only a limited amount of this seed.

Fifteen years ago M. C. Berry discovered this wonderful plant growing on the "Old Gilmer Plantation," near Tyson, Ala. Since that time we have watched with interest its great spread and growth throughout Alabama. As a plow-under green manure crop it has no equal, and for honey we find it wonderful. In gathering this seed we had a lot that through a misunderstanding were mixed with biennial; therefore, our loss is your gain, as we are selling hulled and scarified seed at the following unheard of low prices:

Prices as follows, transportation prepaid:

5 to 10 pounds, 25c a pound; 25 up to 50 pounds, 20c a pound; 50 to 100 pounds, 17½c a pound; 100 pounds and up, 15c a pound.

Seeds are guaranteed to be pure sweet clover running from 50 to 90 per cent pure annual and the balance biennial. Germination we guarantee to please.

M. C. BERRY & CO., Box 697, Montgomery, Ala., U. S. A.

Needed by Every Beekeeper Good Queens

In Every Queen and Package

There is a guarantee of satisfaction that you have a right to expect

BUY FOREHAND'S 3-BANDS, YOUNG AND HUSKY

The three vital needs of successful honey production are, GOOD QUEENS, GOOD MANAGEMENT and GOOD LOCATION. You furnish one, Nature one and I furnish the other. But you must be the judge of all. You don't want a location in a desert, neither do you want poor queens. You have the same right to choose and reject queens as you have to choose your location. My guarantee allows you this.

Your dollar's worth or your dollar back. Order now and get your bees and queens when you want them. Ten per cent is all that is required with order.

	1-4	5-11	12-24
Untested	$1.25	$1.20	$1.15
Select untested	1.50	1.45	1.40
Tested	2.50	2.45	2.40
Select tested	4.00	3.95	3.50

	1	25 and up
One pound pure Italian bees with young queen	$3.00	$2.90
Two pounds pure Italian bees with young queen	5.00	4.75
Three pounds pure Italian bees with young queen	6.50	6.25

All bees and queens guaranteed to reach you in good condition in the United States and Canada.

N. FOREHAND, RAMER, ALABAMA

"HONEY GIRL" QUEENS

St. Romain's Honey Girl, one of my breeding queens, is valued by me at $1,000.

Achievement Girl and Chaffee's Honey Girl, owned by Chaffee-Crites Bee Farms, were raised by me. Achievement Girl I know positively to be a daughter of my St. Romain's Honey Girl; Chaffee's Honey Girl I believe is also a daughter of St. Romain's Honey Girl. I inspected the bees of these queens when I was at the Chaffee-Crites Bee Farms, and I am satisfied that my statements are correct.

I have information from my customers stating that colonies headed by my queens made wonderful productions. This information coming from ten or more states, from Louisiana to Pennsylvania to Oregon, and followed by repeat orders, is proof that I produce queens that are better than ordinary, and probably not equalled.

My queens are light colored, pleasing to the eye and very prolific, occupying from 18 to 20 combs for brood.

I solicit your correspondence and would be pleased to get your inquiries and answer any information desired.

Reasonable satisfaction guaranteed, also safe arrival at your express station. Complaint for damaged packages should be accompanied by Express Bad Order Notation properly filled and signed by Express Agent.

Twenty per cent with order to secure it; your money returned if shipping date is not satisfactory.

I will have about 400 tested queens reared late fall, 1922, and wintered with special care for early deliveries. I can begin deliveries with these earlier than it is possible for me to produce the best kind of untested queens.

BEES WITH QUEENS

3-lb. package with tested queens for shipment after April 15 to end of season.
1 package to 24 packages ..... $7.25 each
25 packages or more ..... $7.00 each
3-lb. packages with untested queens, for shipment after May 5 to end of season:
1 package to 24 packages ..... $6.25 each
25 packages or more ..... $6.00 each

Prices on 2-lb. packages or 5-lb. packages or full colonies will be furnished if desired.

PRICES ON QUEENS

April 15 to July 1.

Tested queen $2.50
Selected tested queen ..... $4.00 to $10.00
Untested queens, none, except with packages.

After July 1.

Tested queen $2.00
Select tested queen ..... $3.00 to $10.00
Untested queen $1.65
Select untested queen $2.00

Untested queens guaranteed to be purely mated.

I will rear only a limited number of daughters from my St. Romain's Honey Girl, and I will rear these only when natural conditions are favorable for producing the very best specimens. I offer them as select tested queens at above prices for that class of queens. A few breeding queens at prices ranging from $50 to $250.

REQUEEN WITH HONEY GIRL QUEENS

J. L. ST. ROMAIN, APIARIST

WHITE CLOVER FARM AND APIARY

HAMBURG, LA.

QUEENS

NORDAN'S THREE-BANDED ITALIAN QUEENS (Three-banded only).

Have won World-wide Fame.

They are guaranteed to be absolutely immune to Bee Paralysis. I am booking orders now for spring delivery.

Prices on Queens and Packages:

Select untested queens, 1 to 50 ..... $1.00 Select tested queens, 1 to 50 ..... $1.50

Packages:

One-pound packages, with select untested queen, 1 to 50 ..... $2.50
Two-pound packages, with select untested Queen, 1 to 50 ..... $4.00

Can make shipments when you want them, either queens or packages. I will appreciate your orders, large or small.

References: Alabama Bank and Trust Co., Montgomery, Ala.

M. S. NORDAN, MATHEWS, ALA.

HONEY

We just received several carloads of beautiful honey. Roadside beekeepers and those supplying a family trade will do well to take advantage of these bargain prices:

In 60-lb. Tins,

White orange ..... 14c lb. White sage ..... 12c lb.
Extra L. A. sage ..... 10½c lb.

GLASS AND TIN HONEY CONTAINERS

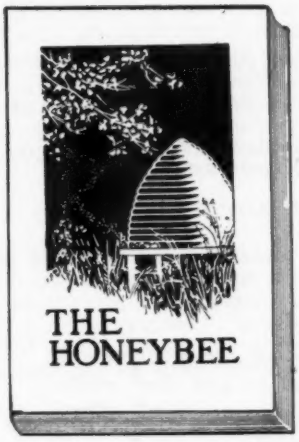
2½-lb. cans ..... crates of 100, $4.50
5-lb. pails (with handles), ... crates of 100, $7.00
10-lb. pails (with handles) ..... crates of 50, $5.25
60-lb. tins, 2 per case, new, $1.20 case; used, 25c.

White Flint Glass, with Gold Lacquered Wax Lined Caps

8-oz. honey capacity ..... $1.50 per carton of 3 doz.
16-oz. honey capacity ..... $1.20 per carton of 2 doz.
Quart, 3-lb., honey capacity ..... .90 per carton of 1 doz.

HOFFMAN & HAUCK, Inc., Woodhaven, New York

UP-TO-THE MINUTE BEE BOOKS



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1000 ANSWERS TO BEEKEEPING QUESTIONS, by C. C. Miller. A compilation of questions as answered by Dr. Miller from fifty years' experience. An excellent supplementary book. Cloth. Price $1.25.

PRACTICAL QUEEN REARING, by Frank C. Pellett. Gives all the ins and outs of the various methods of rearing queens, both for home use and for sale. This book was written only after personal visitation of the most prominent breeders in this country by the author. Price $1.00.

BEEKEEPING IN THE SOUTH, by Kennith Hawkins. Written by a former government extension man who worked several years in all parts of the South. Excellent both for the southern beekeeper and for the northern man who anticipates southern yards. Price $1.25.

OUTAPIARIES, by M. G. Dadant. Gives a practical system of management for outyards, founded on experience. The proper location, placing of yards, rentals, etc. Price $1.00.

SCIENTIFIC QUEEN REARING, by G. M. Doolittle. A thorough description of the author's method of artificial grafting of cells and his mode of queen rearing. Paper cover 50 cents; cloth $1.00.

HONEY LEAFLETS

The beautiful five-color leaflet illustrated at the left has four pages, and gives briefly the methods of raising honey and its value, together with several honey candy recipes. Designed for distribution generally to prospective customers. Price of 500, with your own name and address at the bottom, postpaid, only $7.50; 1,000, $11.50.

Send all orders for books or honey leaflets to

AMERICAN BEE JOURNAL

HAMILTON, ILLINOIS

ARE YOU INTERESTED IN

OUR NEW CATALOG?

Lists standard equipment and new appliances developed by experts for the benefit of beekeepers and better beekeeping.

THE BIG HIVE

Our Jumbo is the most economical big hive built. Used with regular ten-frame equipment. Some of the country's largest beekeepers use Jumbo size exclusively. Let us tell you about it.

AIRCO FOUNDATION

Tear off A. B. J. page here and mail today. Free to you.
Check subjects interested in and mail to us.
THE A. I. ROOT CO. OF IOWA, Council Bluffs, Iowa

☐ The New 1923 Catalog When Ready
☐ The Big Hive
☐ Airco Foundation

The tremendous increase in our Airco business is proof of its ability to stand up and meet every test. It is a money saver. So are you? Then let us help you to get together.

The A. I. Root Co. of Iowa

Council Bluffs, Iowa

A Handsome Engraved Certificate Protects Every Buyer of a Genuine Honey Girl Queen

Get a Certified *Honey Girl* Queen

We ship nucleus of 2 pounds bees, 1 frame stores for travel, and Queen, daughter of St. Romain's Honey Girl. These queens are members of a family with a definite record of honey production.

A NEW PLAN IN BREEDING

FREE: Our Illustrated Brochure, A-31, describing the Chaffee-Crites Bee Farms where, last summer, new records for honey production were established. Orders accepted subject to your approval of shipping date.

CHAFFEE-CRITES BEE FARMS

Amenia "In Bee-free Territory" North Dakota

Crop and Market Report

Compiled by M. G. Dadant.

One outstanding point in reports coming in is that bees have gone into winter quarters strong in young bees and with good queens. We would warn the beginner to watch his colonies carefully early in spring to make sure that none are suffering from a dearth of honey.

Although the prolonged warm fall has tended to diminish stores in many localities, those favored with a late fall flow have been benefitted thereby. In our own locality bees continued to store honey very late, and as a result are going into winter with heavy stores.

CONDITION OF PLANTS

As stated in our last issue, honey plant conditions are much improved over what they were earlier in the fall. Plentiful rains have helped put the clover in good shape in the clover regions. Sufficient snow during the winter should carry the clover through and assure plentiful moisture for its development in the spring.

THE HONEY SITUATION

Reports conflict as to the amount of honey held on hand, some being optimistic and others discouraged. California reports would indicate that the panic of the frightened beekeeper is over. Stocks are reduced and those still holding honey are asking a remunerative price. The same holds true of the inter-mountain territory. On the coast amber honey sold as low as 5½ cents per pound, while a number of cars of comb honey in the Rockies went at a price of from $2.35 to $3.00 per case. Considerable criticism has developed on the part of eastern comb-honey producers who have had the competition of western comb honey which sold at a delivered price to wholesalers of $3.50 to $3.75 per case, whereas the easterner was asking $4.50 to $5.00 per case.

Again, the lack of any definite co-operation on the part of beekeepers is self-evident. Naturally honey will never be sold at satisfactory prices as long as there is such a lack of co-operation as noted above, which not only comes from the big western producer who is willing to take most any price to see his product move, but also from the smaller and more flagrant offender in the east who undercuts beekeepers in his own town with no regard to costs.

One is led to wonder when complaints are made of the jobber, commission man, etc., if a few well placed kicks should not be given some of the beekeepers themselves. The jobber, the wholesaler nor the consumer are going to pay more than is necessary, and in too many instances the ill-informed beekeeper is responsible for the erratic market.

HONEY DEMAND

The demand for honey hardly equals that of a year ago, but the stiffening in prices of the Porto Rican and other imported honeys would indicate that there is sufficient demand on the part of the wholesalers to clean up the present crop if it is properly distributed. Some markets are already clear of honey. Naturally such will not hunt for this product to replenish. But such a market should be supplied.

Southern reports indicate that honey has moved rapidly and that most of the crop is disposed of. A new syrup just being offered at cut prices is having some effect on the amber honey market, not enough, however, to seriously affect it.

GOVERNMENT REPORT

The Government crop report for December 1 is out. It gives the condition of colonies as 94 per cent of normal, the number of bees as 115 per cent of spring count. The per colony average was 54 pounds, as compared with 44 pounds in 1921. The average for comb-honey colonies was 7 pounds less than last 5-year average, while extracted was 9 pounds more.

As suggested in our own earlier reports, the whole East has had a smaller crop than in 1921, with the exception of Rhode Island and Virginia. The South similarly has been short, except North Carolina, Florida and Oklahoma. The Central West was specially favored with a big crop. Michigan had such a magnificent crop last year that she naturally fell behind last year's production. Minnesota and Indiana were average. The Central West and intermountain territory will show light crops, with the exception of New Mexico, while the Pacific slope was much better than a year ago.

All in all, we see no reason for discouragement over the honey situation. There is more to sell, and it has not sold as readily as in 1921. On the other hand, imported honey is less plentiful, and we have been confronted with a long, warm fall, which is not conducive to honey sales. Activity on the part of the beekeeper and wholesaler in keeping markets supplied and in developing trade in those sections which are now under supplied should easily dispose of the crop.

Honey is not an article that sells itself. It is at present impossible to place it either as a luxury or as a staple necessity. Concerted action might easily place it in the latter category.

4000 NUCLEI OR PACKAGE BEES FOR 1923

SUPERIOR ITALIAN QUEENS — WRITE FOR CIRCULAR
POUND PACKAGES — FULL COLONIES, NUCLEI,
CYPRESS BEE SUPPLIES

Hive-bodies, Covers, Bottoms, Supers, Frames. We can furnish you the best of the above at a fair price. Let us quote you.

One-pound package, with queen, 1 to 20, $3.25 each; 25 or more, $3.00 each.
Two-pound packages, with queen, 1 to 20, $5.00 each; 25 or more, $4.50 each.
Three-frame nuclei, with queen, 1 to 20, $5.50 each; 25 or more, $5.00 each.

THE STOVER APARIES, MAYHEW, MISS.

British Columbia Crop

We are in receipt of a letter from Mr. J. Scruton, of South Vancouver, writing that one of their evening papers recently stated, with a great flourish, that the crop of honey of British Columbia this year would be over thirty tons. But, he said, one beekeeper alone, Mr. W. H. Turnbull, has produced over ten tons, and that he knew of three others whose com bined output would exceed the thirty tons. Therefore thirty tons does not begin to cover it. It appears that a very important early yield comes from the Cascara sagrada **(Rhamnus purshiana)** and is useful to the bees to sustain breeding. Pellett reports this tree to exist in northern California, Oregon, Washington and British Columbia. It appears that most of the yield of the Turnbull yards is from two-pound and three-pound packages, purchased at the right time.

Elwood, Indiana, Great Bee Center

According to State Bee Inspector James E. Starkey, Elwood, Ind., a small city of some 10,000 people in Madison County, has more colonies of bees than any other town or city in the state.

This great interest is due to the work of County Agent Jesse Stuttsman. The Vocational Agricultural Class in the high school has a Boys' Bee Club of 15 members, the first one in the state.

Doctors, ministers, factory workers, postoffice mail carriers and clerks, society women, school ma'ams, nurses, nursery salesmen and just folks, keep the busy bee. You will find them on roofs, in back yards and in orchards and open fields near the city limits.

David Miller, an octogenarian, is the local president. Last February he held a "Bee Week." In July a honey show was sponsored by the Citizens State Bank. The local association holds meetings every month. Sometimes 50 people attend these meetings. A. C. Norris.

West Virginia Meeting

The winter meeting of the West Virginia Beekeepers' Association will be held January 30 and 31, 1923, at Market Auditorium Assembly Hall, corner of Eleventh and Market Sts., Wheeling, W. Va.

Resolutions on Death of Friedemann Greiner

The Ontario County Beekeepers' Society passed the following resolutions upon the death of Friedemann Greiner.

Whereas, The Great and Supreme Being of the universe, in His infinite wisdom, removed from among us our esteemed Secretary-Treasurer and coworker, Friedemann Greiner, and

Whereas, The long and faithful intimate relations held by him in this society makes it fitting that we record our appreciation of him and his work, therefore,

Resolved, That the sudden removal of Friedemann Greiner from this life leaves a vacancy that is deeply felt by all the members of this society, and his many beekeeping friends throughout the United States, Canada and Europe; be it further

Resolved, That a copy of these resolutions be forwarded to his bereaved family. Committee.

Bee Journal Suspends

The New Zealand Beekeepers' Journal suspended publication with the October number and its future will be incorporated with the New Zealand Fruit Grower, published at Auckland.

A BOOK YOU WILL ENJOY

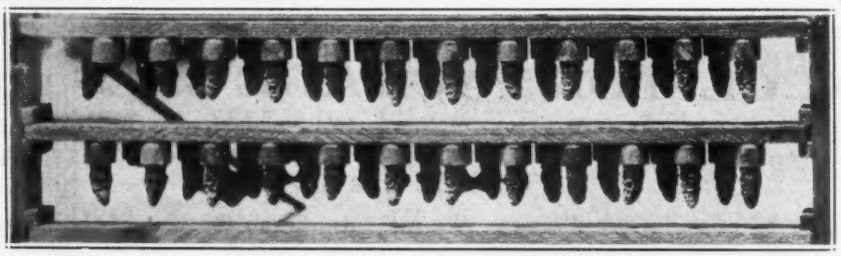
"OUR BACKDOOR NEIGHBORS"

By FRANK C. PELLETT

"It would be almost impossible to excel these charming stories of the Naturalist's adventures with the wild creatures which he discovers and in some cases tames, while living in an old farmhouse amid woodlands and wild flowers. . . . It would be an admirable gift book for a boy, and it should inspire older folks with a greater admiration for the wild creatures of the woods."—The San Francisco Call.

Attractive cloth binding, postpaid, $1.50.

AMERICAN BEE JOURNAL
HAMILTON, ILL.



Our Queens are Started Right by Well Fed Cells

BOOKING ORDERS NOW FOR 1923. QUEENS READY APRIL 1.

We ship thousands of our old reliable three-banded Italian queens all over the United States and Canada every year. Safe arrival guaranteed. Orders booked for one-fourth cash. No disease. Circular free. Nearly every beekeeper who has visited our apiaries has become a customer. There must be a reason.

Prices for April, May and June:

Untested ..... $1.25; 6, $6.50; 12, $12 Tested $2.50; 6, $14; 12, $27
Select untested ..... $1.50; 6, $ 8.00; 12, $15 Select tested ..... $3 each

JOHN G. MILLER, 723 C. Street, Corpus Christi, Texas

Whatcom County Meeting

The January meeting of the Whatcom County, Washington, Beekeepers' Association will be held at Deming, on January 9, at 10 a. m. The subject to be discussed is "Artificial Increase."

A Lively County Association

The Association formed in Cook County, Illinois, is a fine example of what can be done by a local association. Cook County has, in the ten months of its existence, had four winter meetings, with an average attendance of 100; four demonstration apiary meetings, during the summer, and has succeeded in getting two deputy inspectors appointed to clean up foulbrood in the county. The association has a paid membership of 125 beekeepers at $1.00 each.

According to their officers, much of the success is due to the thoroughness with which they advertised the meetings and the promptness with which all of their work was conducted. The second year the membership dues have been increased to $2.50, 50 cents of which affiliates them with the State Beekeepers' Association.

The Effect of Grading on the Market

It is interesting to note that, in Wisconsin, where they have strict grading laws for marketing honey, the graded honey is sold almost universally at a standard price. Those who do not wish to conform to these laws must market their honey as ungraded. The consumer looks for the graded article, however, and is willing to pay the difference. This eliminates price cutting.

Colony Restlessness from Loss of Virgin

A close student of bee behavior recently called our attention to an observation which he had made of colonies which lose virgin queens from failure to mate. He says such colonies show extreme signs of restlessness and that the queen raiser can detect these errors in mating by observing the behavior of bees at the hive entrance. This is an interesting fact and we are wondering if others have observed it also.

Nuclei Our Specialty—Package Bees

Three-banded Italian Queens

Our BEES and our EXPERIENCE will give you prompt and satisfactory service.

One 2-frame nuclei, no queen, $3.75; 25 or more, $3.50; 50 or more, $3.25; 100 or more, $3.00.

One 3-frame nuclei, no queen, $5.00; 25 or more, $4.75; 50 or more, $4.50; 100 or more, $4.25.

QUEENS: One untested queen, $1.50; 12, $15; 50, $60; 100, $100.

Two and three-pound packages of bees at the same price of two- and three-frame nuclei, respectively. Our early order discounts from above prices will interest you. Write and get them before placing your order.

Cotton Belt Apiaries, Roxton, Texas

HARDY DISEASE RESISTING BEES

Bred high up in the Alleghany Mountains, under conditions that make long-range honey gatherers. The best bees that it is possible for your money to buy; Goldens, three-band, and leather color; 20 per cent books your order for delivery in May or June. Send me a trial order. I want to please you. A two-frame nucleus with one pound of bees and one untested queen, mated introduced and laying enroute to you. Price $6.00. Safe delivery guaranteed. Place your order. Do it now! Don't put it off until tomorrow. There are no better bees than the stock that I am offering for spring shipment. Address,

HIRAM H. BEAR, Hinton, West Virginia

Bees in Packages

Package bees at reduced prices; thoroughbred Italian queens, three-banded stock; quality queens guaranteed. I ship to various parts of the United States and Canada every spring; unsolicited testimonials and repeat orders prove satisfaction. My bees are healthy. Shipments begin April 15; order early. Three-frame nuclei and combless packages a specialty. Write for circular of special offers. Safe arrival or replacement guaranteed.

C. M. ELFER, St. Rose, La.

WE ARE BOOKING ORDERS FOR 1923 DELIVERY
ORDER NOW

Berry's Reliable Package Bees and Bright Three-Banded Italian Queens

Twenty-seven years of selective breeding gives us a strain of pure Italian bees that are unsurpassed for their disease-resisting (especially European foulbrood) and honey-gathering qualities. Read what others say about them.

"Enclosed find $75 for 50 untested queens. I want these for requeening colonies that have European foulbrood, as I find your strain resistant. One of the queens bought of you last season built up from a nucleus and made a surplus of 360 pounds of honey." This same colony with drawn combs furnished, no doubt would have broken the record by making over 700 pounds of surplus. We rear our queens from mothers that are just as good.

"The two-pound packages bought of you made an average of 150 pounds of surplus honey. I find your bees not only hustlers, but also gentle."

Let us mail you our latest circular and price list.

M. C. BERRY & CO., Box 697, Montgomery, Ala., U. S. A.

What They Want

The Legislative Committee of the Wisconsin Beekeepers' Association announce their program in the November number of the association organ. They ask for an appropriation for the association to cover printing of annual reports, etc., expense of securing outside speakers and arranging of exhibits. They also ask for a new building for the beekeeping work at the University, and legislation to cover the spraying of fruit trees while in bloom.

Some Business

It has recently been stated that members of the Ontario Beekeepers' Association have obtained $60,000 worth of goods, including half a million containers and $10,000 worth of bees and queens through Secretary F. E. Millen.

SLIGHTLY DAMAGED BOOKS

In revising our stock of books, we find a number of partly damaged and second-hand books, good for all practical purposes, but not worth full price.

We offer these at the following postpaid prices:

Langstroth, revised new edition	$1.65
Cook's Manual of the Apiary	.85
A Thousand Answers to Beekeeping Questions	.85
American Honey Plants	1.65
Practical Queen Rearing	.65
First Lessons in Beekeeping	.65
Outapiaries	.65
Beekeeping in the South	.75
Dadant System of Beekeeping	.65
Doolittle's Scientific Queen Rearing	.35

Address all orders to

AMERICAN BEE JOURNAL
Hamilton, Ill.

The Bowers Adjustable Division Board
Adjustable to Length

Patented June 21, 1922.

Most convenient and efficient board ever used. Endorsed by expert beemen as a very practical, valuable device. Thoroughly tested. Sold on money-back guarantee.

One board, parcel post, 75 cents.
Circulars, prices, etc.

F. D. BOWERS,
Sugar Grove, Pa.

Wisconsin Beekeeping

"Wisconsin Beekeeping" is now published as a reparate supplement to "Wisconsin Horticulture," and no longer bound as a part of the latter publication as formerly. The official organ of the Wisconsin Association is filled with information of immediate interest to members and keeps them informed concerning the work of the organization.

Honey Facts

At a meeting of mid-west beekeepers held at Council Bluffs, Mr. Huber Root gave a very interesting talk concerning present dangers in the beekeeping industry. Mr. Root had gone to considerable trouble to bring these facts to the attention of beekeepers and some of the details of his remarks were most carefully worked out and deserving of commendation.

He pointed out the present unstable condition which exists in handling honey which, to a large extent, makes it unprofitable for the dealers concerned with marketing produce to attempt to handle it. He was most emphatically of the opinion that a great menace to beekeeping lay in the present practice of retailing honey below cost of production and at a wide range of prices. Probably even greater than this, however, is the menace which exists in the lack of effort on the part of beekeepers to increase and popularize the demand for honey.

Isn't it So?

Backward: The Lord never intended bees to be kept in modern hives.

Forward: No, nor chickens in chicken houses, nor cows in barns.

ROOT QUALITY

BEE SUPPLIES
FULL STOCKS PROMPT SERVICE
A. I. ROOT CO., of N. O.
2042 Magazine Ave., New Orleans La.

Also headquarters for Elton Warner's three-banded Italian Queens, Nuclei and Combless Packages.

One Elton Warner Quality untested queen, one frame emerging brood with adhering bees, and one pound of young vigorous bees, price $5 f. o. b. New Orleans. Extra bees, $1 per lb.

3-frame nucleus, with Elton Warner Quality untested Queen, price $5.50 f. o. b. New Orleans.

Combless packages, $1 for package, plus $1 per pound for bees, and price of queen, if queen is wanted.

Young, vigorous TESTED Elton Warner Quality Queens; wonderful honey-gathering strain for EARLY spring shipment. $1.60 each, postpaid.

Untested Elton Warner Quality Queens, After April 10, $1.15 each, postpaid.

Everything guaranteed, including delivery date. No disease; 20 per cent books order; 10 per cent discount on orders of over $20; 15 per cent discount on orders of $60 or over.

Almacen de exportacion para Mexico y Centro America. Correspondencia en castellano.

Is the Young Larva a Worker or a Queen?

Mr. E. M. Cole, of Audubon, Iowa, recently asked us this question. He takes exception to the usual statement that bees change worker larvæ into queen larvæ by feeding them a special food and constructing a special kind of cell for them. He argues that the exact facts are the reverse of this; that bees do not change the nature of the larva, but simply continue to feed it a specially prepared food and give it more room so that its development continues uninterrupted into a queen. He argues that every larva is a queen larva until it is starved into submission and becomes a dried-up female which we call the worker bee. He is about right, isn't he?

Wisconsin Grading Rules

"Grading and Marketing Wisconsin Honey" is the title of a recent bulletin from the Department of markets at Madison. All honey offered to Wisconsin consumers must be graded acording to the rules outlined. Honey produced outside the state must have the fact shown on the label. The honey is graded as to color and quality and the label must bear the number of the packer. Producers not wishing to grade their honey can sell by marking it as "ungraded." Every beekeeper interested in selling in Wisconsin markets should send for a copy of the bulletin. Address Department of Markets, Madison, Wis.

New Hampshire Meeting on Jan. 12

The annual meeting of the New Hampshire Beekeepers' Association will be held at Concord, N. H., on Jan. 12, in connection with the meeting of the Farm Bureau. It is hoped that all beekeepers within reach will be in attendance.

J. R. Hepler, Sec'y.

West Virginia Meeting in January

The annual meeting of the West Virginia Beekeepers' Association will be held on January 30 and 31, at Market Auditorium Assembly Room, Cor. Market and 11th Sts., Wheeling, W. Va. All beekeepers within reach of this meeting are urged to attend.

Will C. Griffith, Sec'y.

FRENCH EDITION

Dadant System of Beekeeping

By C. P. Dadant

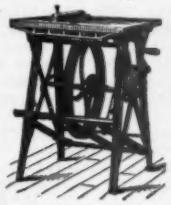
Mr. C. P. Dadant has translated the "Dadant System of Beekeeping" into French, and this book is now out and ready for distribution. It is cloth bound, well illustrated, and we recommend it to anyone desirous of obtaining his bee books in the French language. **Price $1.00.**

Address American Bee Journal, Hamilton, Ill., or Comptoir Apicole Quebecois, Levis, Quebec, Canada.

BARNES' FOOT POWER MACHINERY

Read what J. E. Parent of Chariton, N. Y., says:

"We cut with one of your Combined Machines last winter 50 chaff hives with 7-in. cap, 100 honey-racks, 500 frames and a great deal of other work."

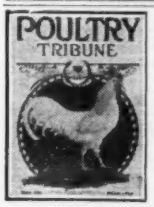


W. F. & JOHN BARNES CO.,
995 Ruby St., Rockford, Ill.

BOOKING ORDERS NOW

for spring delivery. Let me know your needs and I will send lowest prices. My Italian queens are guaranteed to be as good as money can buy. Very prolific, gentle, and the very best honey gatherers. Safe arrival guaranteed. Write.

ULIS BLALOCK, Christine, Tex.



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Showing Champions in all Breeds and Full Page Art Chicken Pictures, natural colors, suitable for framing, FREE with several issues during year.

3 Months' Trial US 1c stamps accepted **15c**

Monthly 80 to 120 pages. Practical articles by foremost poultrymen. 1 yr. $1; 2 yrs. $1.50; 3 yrs. $2.

Poultry Tribune, Dept. 6 Mt. Morris, Ill.

1923 GREETINGS

From Howell's Queens

A SUCCESSFUL YEAR TO YOU

Untested $1.00
Tested 2.00

Early orders filled promptly.
No disease.

D. W. HOWELL, Shellman, Ga.

TENNESSEE QUEENS

Book your orders early for pure Italian queens. My three-band Italian bees will please you. My direct crossing makes them hardy, prolific and vigorous. No disease. Get service while you can. Write for price and circular.

A. REYNOLDS,
Crestview, Tenn.

3-BAND ITALIANS

The Best of Queens and Package Bees

Be sure and get our catalog and prices before placing your order for bees and queens. Mail us a postal NOW.

HERMAN McCONNELL,
Robinson, Ill.

BEES — ITALIAN BEES — BEES

Full colonies with Italian queen at $15.00, 3 for $30.00.

3-frame nucleus with Italian queen at $6.00.
3-lb. package with Italian queen at $5.50, 5 at $5.00.

No disease. Safe arrival and satisfaction guaranteed. Van's Honey Farms,
Van Wyngarden Bros., Props., Hebron, Ind

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QUEENS

3-banded queens, $1.25 each; 6 for $7; 12 for $12.
3-frame nuclei, with queen, $5.50; packages, $2 per pound.
Can furnish bees in 8-frame hives used some time, at $11.

Mr. F. M. Chesser, of the Institute of Greensboro, with the aid of his teacher once a week, will have charge of part of my queen-rearing here. Excellent men.

CURD WALKER, Scott Station, Ala.

Over 100,000 Queens

Our breeder made the above record in twelve years, being employed by the largest breeders of the South most of the time. So we feel like we can offer good reliable queens, and if they do not give satisfaction we will replace them or refund your money. Will start mailing queens April 1.

Our Prices—Untested

1 to 12 ..... $1.20 each
12 to 100 ..... 1.10 each
100 to 1000 ..... 1.00 each

Tested Queens

1 to 12 ..... $1.50 each
12 to 100 ..... 1.40 each

THE CITRONELLE, APIARIES
Citronelle, Ala.

INDIANOLA APIARY COMPANY

Italian Bees and Queens, bright golden and 3-banded. Orders booked for season of 1923 as follows:

1-lb. pkg. bees with unt. queens....$3
2-lb. pkg. bees with unt. queens....$5
3-lb. pkg. bees with unt. queens....$6

Ten per cent discount on orders of $25 or more.

Untested queens ..... $1.00 each
Tested queens ..... $1.50 each

Thirty years' experience, hundreds of satisfied customers. Your orders solicited. Satisfaction guaranteed.

J. W. SHERMAN, Valdosta, Ga.

American Poultry Journal

Oldest, Largest and Best

4 MONTHS' TRIAL 25 cts.

1 Yr. 75c **2 YEARS $1** 5 Yrs. $2

Averages over 100 pages per issue—tells how to feed, house and breed; how to secure high egg production; how to hatch and rear poultry successfully. Established 1874. Only 25c for 4 mos. Stamps accepted.

American Poultry Journal, 84-523 Plymouth Ct., Chicago

Olds' Seeds

Known for Reliability 35 years. We specialize in **Field Seeds.** Our Clover, Timothy and Alfalfa are standards for purity, hardiness and high germination.

Wisconsin stands first in **Pedigreed Grains.** We offer Pedigree Nos. 1, 5 and 7 Oats, Pedigree Barley, Wheat and Rye, Wisconsin grown Seed Corn, Nos. 12, 7, 8 and 25, Cold Resistant and Murdock.

Full line of **Dependable Garden and Flower Seeds,** Bulbs, Plants, Poultry Supplies.

"Olds' Catalog Tells the Truth"

Write for a copy at once. Ask for free samples Field Seeds interested in.

L. L. Olds Seed Company
Drawer 1 Madison, Wis.

Honey in the Local Newspapers

A set of 25 articles on honey, specially prepared for distribution by the beekeeper to local papers to stimulate the demand for honey. These articles deal with interesting phases of beekeeping which will interest the ordinary reader and help make a buyer of him.

We offer the whole set of 25 articles at a postpaid price of only 50 cents, or in lots of ten or more sets at 35 cents each, postpaid.

A real opportunity to have your local people get interested in honey and its production and use.

Order a set today.

AMERICAN BEE JOURNAL
Hamilton, Ill.

CLASSIFIED DEPARTMENT

Advertisements in this department will be inserted for 5 cents per word, with no discounts. No classified advertisements accepted for less than 35 cents. Count each initial or number as one word.

Copy for this department must reach us not later than the 15th of each month preceding date of issue: If intended for classified department it should be so stated when advertisement is sent.

BEES AND QUEENS

ATWATER offers carload best table honey. 8c.

I AM BOOKING ORDERS now for next spring delivery, 3-frame nuclei and queens at the same price as last year. Caucasian or Italian race.
Peter Schaffhauser, Havelock, N. C.

BEES AND QUEENS—I am now booking orders for early spring delivery. Have best strains of Italian bees. Write for prices.
N. L. Stapleton, Colquitt, Ga.

BIG bright Golden Italian Queens, the kind that are bred for beauty and also honey gathering qualities. We guarantee to please you. Price, untested, $1.25 each, 6 for $6.00, 12 for $11.00; $85 per 100. Tested, $2.00.
Honoraville Bee Co., Honoraville, Ala.

NOW booking package bees. Pure Italian queens, 3-banded stock. Write for circular. See display advertisement, this issue.
C. M. Elfer, St. Rose, La.

REDUCED PRICES on packages, nuclei and queens for spring delivery.
J. J. Scott, Crowville, La.

TRY THE ACHORD STRAIN OF ITALIANS—They have produced wonderful honey crops in many states. A postal will bring you a descriptive price list of swarms and queens.
W. D. Achord, Fitzpatrick, Ala.

NUCLEI, PACKAGE BEES and ITALIAN QUEENS for spring delivery, the kind customers recommend to their friends. We have been shipping queens and bees for many years and aim to please our customers. Three-banded Italian queens, untested, $1; tested, $2. Write for price list on breeders, comb-less bees and nuclei.
Allenville Apiaries, Allenville, Ala.

PACKAGE BEES AND NUCLEI—Best quality Italians; no disease. Booking orders spring delivery. Write for prices.
M. L. Nisbet & Bro., Bainbridge, Ga.

"FLORIDA FIRST" QUEENS for April, May and June, $1.50 each; 5 for $7. Early order discounts during January and February. Circular free. R. C. Boswell, Manager,
Indian River Apiaries, Wilson, Fla.

THAGARD'S ITALIAN QUEENS have stood the test with thousands of beekeepers in the past. Our 1923 strain will be still better. 1 to 12, $1.25; 12 to 49, $1.10 each. Package bees a specialty.
The V. R. Thagard Co., Greenville, Ala.

SEE our large Ads. elsewhere in Journal for both bees and sweet clover seed. Both are great honey producers.
M. C. Berry & Co., Montgomery, Ala.

FOR descriptive price list of Carniolan, Caucasian, Italian and Golden queens, write to Grant Anderson, Rt. 2, Waco, Texas.

GOLDEN ITALIAN QUEENS—Good as the best. Ready April 15. Select untested, $1.25; dozen, $13; Select virgins, 60c; dozen, $5. Safe arrival and satisfaction guaranteed. A trial solicited.
Crenshaw County Apiary, Rutledge, Ala.

3-BAND ITALIANS, developed from the best and most popular strains by continuous selection. When I can produce or discover better, they will be adopted. Queens, untested, after May 15, $1.50 each, 6 for $8. Tested, $2.50 each. CARNITALIANS—Five miles from my Italian yard I raise Carnitalians, a cross derived from Jan Strgar Carniolan queens and Golden Italian drones. I calculate fifty years to get color marking fixed. Don't wait for that; the blend of blood and quality is there now. Tested queens, after June 1, $2.50 each.
John Protheroe, Rustburg, Virginia.

**BRIGHT THREE-BAND ITALIAN QUEENS—85c each, six or more $8 a dozen. After October 20, $1.00 straight. I am now booking package bees, queens and nuclei for March, April and May. Get my prices and terms before ordering. J. L. Morgan,
Tupelo Honey Co., Columbia, Ala.**

FOR SALE—Package bees and queens. See large ad. elsewhere in this Journal.
H. B. Murray, Liberty, N. C.

FOR SALE—1923 golden Italian queens, $1.25; dozen, $12. Safe arrival and satisfaction guaranteed
J. J. Sanford & Son, McKenzie, Ala.

BEAR'S MOUNTAIN BEES are best. See ad on page 45.

FOR SALE—Pure Italian bees and queens, 3-banded, 2-pound packages with selected queens, 1 to 5, $5; 5 to 25, $4.75; 25 or more, $4.50, delivered. Queens, 1 to 50, $1 each; 25 per cent cash books the order, balance a few days before shipping season begins. Shipping season opens April 15. No disease; safe arrival and satisfaction. We ship only the best.
W. C. Smith & Co., Calhoun, Ala.

NUCLEI AND PACKAGE BEES—Send for circular.
Allen Latham, Norwichtown, Conn.

PICK WINNERS for your honey crop, their cost is usually no more. A card will bring circular and price list of our queens, our package bees and our nuclei.
R. V. Stearns, Brady, Texas.

PACKAGE BEES—2000 big, strong, healthy colonies; will be ready to supply package bees in the spring. Italian or Carniolan queens. Let me quote prices and book your order early. A small deposit reserves shipping date. Circular free.
J. E. Wing, 155 Schiele, Ave.,
San Jose, Calif.

GOLDEN ITALIAN QUEENS for 1923, the big, bright, hustling kind. Satisfaction guaranteed. Price, untested, $1 each, 6 for $5, 12 for $10, $75 per 100. Tested, $1.75 each; also a few 1 and 2-frame nuclei. Write for prices on nuclei.
E. F. Day, Honoraville, Ala.

PACKAGE BEES and nuclei. See add on page 38. Loveitt Honey Co.,
602 N. 9th Ave., Phoenix, Ariz.

SEE my display ad. in this number.
Jes Dalton, Bordelonville, La.

ITALIAN BEES, brood and young queens for delivery April 15 to June 15. One frame emerging brood and bees. one extra pound of bees, one young Italian queen, all for $5.00; 25 or more, $4.75; 50 or more, $4.50. Bright three-banded stock only; no disease; safe arrival and satisfaction guaranteed; 25 per cent deposit to book order.
R. S. Knight, R. F. D. 2, New Orleans, La.

SEE MY DISPLAY ADV. for package bees, queens and nuclei.
W. H. Moses, Lane City, Texas.

HARDY ITALIAN QUEENS, $1 each.
W. G Lauver, Middletown, Pa.

PACKAGE BEES for 1923—Now booking orders for Yancey Hustlers. See larger ad. for prices. Caney Valley Apiaries,
Bay City, Texas.
Yancey Bros., Owners.

FOR SALE—60 colonies bees, with location or without location.
Carl Sommerdorf, Brownton, Minn.

WE ARE BOOKING ORDERS NOW for queens and package bees for next spring delivery. Graydon Bros.,
Rt. 4, Greenville, Ala.

PACKAGE BEES AND QUEENS—Three-band or golden; best strains of either; hardy, no disease. Booking orders for 1923. Circular free. Prices reasonable.
Dr. White Bee Company, Sandia, Texas.

PINARD'S quality of Root's and Prof. Coleman's strain of bees and queens. Booking orders for spring delivery. Promptness and satisfaction my motto. Prices right; circular free.
A. J. Pinard, Morgan Hill, Calif.

BEES AND QUEENS from my New Jersey apiary. J. H. M. Cook,
86 Dey St., New York City.

PACKAGE BEES AND QUEENS for 1923—Am now booking orders for next spring shipment. Write me for prices. Nothing but pure Italians. No disease.
Jasper Knight, Hayneville, Ala.

BEES BY THE POUND, ALSO QUEENS—Booking orders now. Free circular gives prices, etc. See larger ad elsewhere.
Nueces County Apiaries, Calallen, Texas,
E. B. Ault, Prop.

BEES AND QUEENS—I have a limited amount of hybrid bees, not fully Italianized, I am going to offer for spring delivery at the following bargain prices: 1-lb. package, $2.75; 10 or more, $2.50 each; 2-lb. package, $3.75; 10 or more, $3.50 each; 3-lb. package, $4.25; 10 or more, $4.00 each. Young untested Italian queen included with each package at the above named prices. This is a real saving to the purchaser, for in a few weeks the colony will Italianize. Ten per cent books your order. Prompt and safe delivery guaranteed. Never had a case of foulbrood in my apiaries. Would urge my old customers to place orders early.
H. E. Graham, Gause, Texas.

**GOLDEN QUEENS, GOLDEN—1923 price: untested, one, $1.25; doz., $12. Select untested, one, $1.50; doz., $15; tested, one, $2.50, doz., $27.50. Pure mating and safe arrival guaranteed in United States and Canada. Booking orders now.
Tillery Bros., Georgiana, Ala.**

**BEES AND QUEENS at reduced prices. Cypress hives for sale. Write for terms.
Otto Diestel, Elza, Ga.**

**FOR SALE—Leather colored Italian queens, tested, until June 1, $2.50; after, $2. Untested, $1.25; 12, $13. Root's goods at Root's prices. A. W. Yates,
15 Chapman St., Hartford, Conn.**

**CARNIOLAN QUEENS—None better. Select tested, $2.50 each; select untested, $1.25 each. Also choice Italians, same prices. Send for circulars.
Geo. W. Coltrin & Son, Mathis, Texas.**

HONEY AND BEESWAX

ATWATER offers carload best table honey, 8c.

FOR SALE — White and amber extracted honey. Write for prices. State quantity wanted. Dadant & Sons, Hamilton, Illinois.

CHOICE extra fancy white clover honey in new 60-lb. cans, 120 lbs. net, $14. Sample 20c. Write for prices on larger quantities. 100 cases extra fancy Hubam clover honey, same price; fancy comb honey, $5 per case 24 sections, 8 cases to carrier.
Edw. A. Winkler, Rt. 1, Joliet, Ill.

FOR SALE—30,000-lb. car extra white clover-alfalfa honey in 60-lb. cans. Quality the best. The Custer Battlefield Apiaries, Hardin, Mont.

FOR SALE—Extracted choice clover honey; 5, 10 and 60-lb. containers. Write for prices.
Mike Larson, Gardner, Ill.

CARLOAD BUYERS WRITE—Fine alfalfa clover honey, carlot, 8c pound.
E. F. Atwater, Meridian, Idaho.

FOR SALE—Spanish needle-honey. Fine body and flavor. In 5-lb pails and 60-lb. cans. Write for price. State quantity wanted.
F. W. Luebeck, R. 2, Knox, Ind.

FOR SALE—Several tons of light amber and white clover extracted honey, strictly A No. 1. Send in your offers, or write me.
Lee Horning, Rt. 4, Morrison, Ill.

FOR SALE—White and light amber honey in 60-lb. cans. Samples and price on request.
The A. I. Root Co., Inc.,
23 Leonard St., New York City, N. Y

HONEY FOR SALE—In 60-lb tins; water white orange, 14c; white sage, 12c; extra light amber sage, 10½c New York State buckwheat, 10c, for immediate shipment from New York.
Hoffman & Hauck, Woodhaven, N. Y.

FOR SALE—White clove honey, case of 120 lbs. $13.80. Sample 20c to apply on first order.
Martin Carsmoe, Ruthven, Iowa.

FOR SALE—Clover extracted honey, 60-lb. cans, 11c pound; 5-lb. pails, 12 pails to case, $9 delivered to railroad here.
J. P. Goodwin, South Sioux City, Neb.

FOR SALE—Comb and extracted honey.
W. C. Moon, Henry, Ill.

FOR SALE—9 barrels extra fine extracted white clover honey, 7 barrels fine light amber fall honey. Can put this honey up in 60-lb. tin cans and 5 and 10-lb. tin pails. Purity and quality guaranteed. Prices on application if you state quantity wanted. Sample 10c.
Emil J. Baxter, Nauvoo, Ill.

EXTRA FINE light amber honey in cases of twelve 5-lb. pails, $9.60; twelve 10 lb., $18; F. O. B. Lansing. This honey is liquefied and filtered, making it a very fine product.
W. A. Lexen, East Lansing, Mich.

FOR SALE—Clover-basswood extracted honey in 60-lb. cans, single can, 15c lb., large lots 12c. John Olson, Davis, Ill.

FOR SALE—No. 1 white comb, $6 per case; No. 2 white, $5 per case of 24 sections; dark comb $1 per case less; in 24 case lots 50c per case less; dark and amber extracted 10c per pound, two 60-lb. cans to case; amber baking honey in barrels, 8c per pound. Discount on extracted in quantities.
H. G. Quirin, Bellevue, Ohio.

FOR SALE—Bees, comb and extracted honey.
A. L. Kildow, Putnam, Ill.

FOR SALE—Choice clover extracted honey in case or carload lots. Comb honey in Danz. and Beeway sections, packed in 6 or 8-case carriers. Quality unexcelled.
J. D. Beals, Oto, Iowa.

BEESWAX WANTED—We need large quantities of beeswax and are paying good prices now. Ship to us at Hamilton, Ill., or Keokuk, Iowa, or drop us a card and we will quote f. o. b. here or your own station, as you may desire. Dadant & Sons, Hamilton, Ill.

FOR SALE—Choice white clover and basswood honey, mostly basswood. State quantity desired.
Jos. Hesseling, Potosi, Wis.

FOR SALE—Choice new clover extracted honey; put up in new 60-lb cans. Write for prices, stating quantity desired.
W. M. Peacock, Mapleton, Iowa.

HONEY—Atwater sells fine alfalfa-clover honey, extra strong cases, case of two 60-lb. cans, $12; case of twelve 5-lb. pails, $7.80, all f. o. b. here. Ten-lb pails all sold out; plenty of the others on hand.
E. F. Atwater, Meridian, Idaho.

SUPPLIES

ATWATER offers carload best table honey, 8c.

WESTERN BEEKEEPERS—We can demonstrate that you can save money on buying bee supplies of best quality. Write for our latest price list.
The Colorado Honey Producers' Association,
Denver, Colo.

HAVE YOU any Bee Journals or bee books published previous to 1900 you wish to dispose of? If so send us a list.
American Bee Journal, Hamilton, Ill.

FOR SALE

ATWATER offers carload best table honey, 8c.

FOR SALE—1,000 extracting supers with comb; no disease. Pure buckwheat flour and extracted clover honey; also 300 colonies of bees.
Chester E. Keister, Orangeville, Ill.

FOR SALE—160-acre farm in Aitkin County, Minn; a good place for bees. Will take 100 good colonies of bees for part payment.
George Wicks, Elmore, Minn.

SEE my display ad in this issue. Bear.

FOR SALE—18 hives containing bees and 1922 crop comb honey in same, 8 1-3c p lb.
Wm. A. McAdoo, Medina, Tenn.

FOR SALE—30,000 lbs. of white clover honey (not sweet clover), in new 60-lb. cans, two in case, at 12½c per pound; in 5-lb. pails, 12 in case, at 80c per pail, $75 per hundred, f. o. b. Waterville. Sample 15c. No better honey in the market.
F. W. Summerfield, Waterville, Ohio.

FOR SALE—Owing to failing health, I am offering for sale my entire business, including 235 colonies bees in new 10-frame hives with new winter cases; 700 full supers drawn comb, tanks, boiler, engine, extractor and all that goes to make a complete outfit; 5 acres irrigated land with good buildings, full basement; one-half mile from Hardin. Good location. If interested write.
S. F. Lawrence, Hardin, Mont.

FOR SALE—"Superior" Foundation (Weed process). Quality and service unexcelled.
Superior Honey Co., Ogden, Utah.

FOR SALE—Good second-hand 60-lb cans, two cans to a case, boxed, at 60c per case f. o. b. Cincinnati. Terms cash.
C. H. W. Weber & Co., 2163 Central Ave,
Cincinnati, Ohio.

MISCELLANEOUS

ATWATER offers carload best table honey, 8c.

SEE Bear's six-dollar offer in display pages.

CASH for old bee books and journals. Write to me what you have. Francis Jager,
University Farm, St. Paul, Minn.

FOR SALE—Hubam annual sweet clover seed. Grown in rows and kept perfectly clean, therefore absolutely pure. Price, 50c per pound in lots less than one bushel; one bushel or more, $25.00 per bushel. All f. o. b. Holgate, Ohio. Noah Bordner, Holgate, Ohio.

HON-E-NUT CANDIES—Made from pure honey, nuts and chocolate. The most wholesome candy made. Try it and be convinced; $1 per pound, postpaid.
Fairmount Apiaries, Schuylkill Haven, Pa.

PLANS FOR POULTRY HOUSES—All styles, 150 illustrations; secret of getting winter eggs, and copy of "The Full Egg Basket." Send 25 cents.
Inland Poultry Journal, Dept. 56,
Indianapolis, Ind

SITUATIONS

ATWATER offers carload best table honey, 8c.

EXPERIENCE AND FAIR WAGES to active, industrious young man for help in well-equipped apiaries. Six hundred and fifty colonies April to December. State age, height, weight, occupation and wages desired.
The Pettit Apiaries, Georgetown, Ontario, Can.

WANTED—Student apiary assistant, coming season; experience not essential; lady preferred. Near Waco, Tex. Address,
B. F. Newman, Axtell, Texas.

WANTED

ATWATER offers carload best table honey, 8c.

WANTED—An energetic young or middle-aged man to manage and take care of about 200 colonies of bees. Must have some experience with bees and be willing and anxious to learn more. If not busy with bees can employ in building trade. Address,
The Delray Apiaries, Delray, Fla.

WANTED—A helper in our Florida Key Apiaries for season 1923 A man with some experience in queen raising desired. State age, experience and wages expected.
Hugh M. Matheson,
418 S. 2nd Ave., Miami, Fla.

WANTED—Saw table, also extractor,
Lorenzo Clark, Winona, Minn.

MY six dollar package is a winner. See display advertisement. Hiram H. Bear

WANTED—First three complete volumes of Gleanings in Bee Culture for the years 1873, 1874 and 1875.
W. H. Humphries, Midvale, Va.

WANTED—Two-frame Novice extractor; must be in good shape.
J. B. Huffman, Buena Vista, Va.

WANTED—3,000 pounds best quality fairly light honey. Send sample and quote lowest price. Charles Meier,
28 Wolcott Ter., Newark, N. J.

WANTED—Honey, white clover bulk comb and extracted.
W. A. Hunter, Terre Haute, Ind.

WANTED—350 colonies bees to work on shares. Western location preferred.
Edward Sheda, Rt. 4, Box 44, Greeley Colo.

WANTED—25 3-frame nuclei on Jumbo frames, with queen, for May 1 delivery.
E. Timmerman, Rt. 1, Pacific Junction, Ia.

WANTED—Your order for "Superior" Foundation. Prompt shipments at right prices.
Superior Honey Co., Ogden, Utah.

WOULD LIKE TO BUY some more good honey, some beeswax and also maple syrup.
Paul Thomae, 1156 Third St., Milwaukee, Wis.

WANTED—Shipments of old comb and cappings for rendering. We pay the highest cash and trade prices, charging but 5c a pound for wax rendering. Fred W. Muth Co.,
204 Walnut St., Cincinnati, Ohio.

WANTED—400 colonies bees with locations and full equipment on share basis, for season of 1923, or longer if pleased, for extracted honey. Bees to be in modern hives and free from disease. Geo. P. Mathis,
Reynoldsville, Ill.

BEESWAX WANTED—We need large quantities of beeswax and are paying good prices now. Ship to us at Hamilton, Ill., or Keokuk, Iowa, or drop us a card and we will quote f. o. b. here or your own station, as you may desire. Dadant & Sons Hamilton, Ill.

FOR EXCHANGE

EXCHANGE FOR BEES—One steam pressure canning outfit which will can 500 cans per day. This outfit is complete.
O. L. Picaman, Litchfield, Ill.

WOULD TRADE 160 acres farm land for good bee farm.
F. L. Durkee, Rt. 4, Ottawa, Ill.

WE WANT MEN

to buy our Guaranteed Nursery Stock. To the Gardener: Write us your needs on Landscape Work. Write for plants. To the Buyers: Send for free colored circular. **The Coe, Converse & Edwards Co.**, Wisconsin's Largest Nursery, Fort Atkinson Wis.

Booking Orders for May Delivery 1923

My introduced-laying-enroute queens and packages. One good, vigorous, young queen, one standard Hoffman frame of emerging brood and adhering bees, and one additional pound of bees Price complete f. o. b. Bordelonville, $5.00.

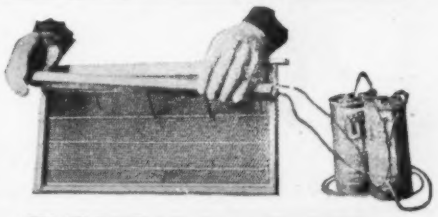
Additional frames of brood, or additional pounds of field bees to make larger package, $1 each, respectively in above packages. Bees and queen Italians. Queen introduced and laying enroute to you. Health certificate attached. Safe arrival and satisfaction guaranteed. One-fifth cash books order. Send for circular and names of satisfied customers in your state. Complete references given.

Jes Dalton, Bordelonville, La.

JAY SMITH

HIGH GRADE ITALIAN QUEENS

Route 3, Vincennes, Indiana.
A card will bring our catalog.



ELECTRIC IMBEDDER

Price without Batteries, $1.00

Not Postpaid.
Weight 1 lb.

Actually cements wires in the foundation. Will work with dry cells or with city current in connection with transformer. Best device of its kind on the market.

Dadant & Sons, Manufacturers HAMILTON, ILL.

PORTER

BEE ESCAPE SAVES HONEY TIME MONEY

For Sale by all dealers
If no dealer, write factory
R. & E. C. PORTER, MFRS.
Lewistown, Ill., U. S. A.

(Please mention Am. Bee Journal when writing)

You can have cash for your wax and old combs or cappings at the market price, or we allow a little more in exchange for supplies

Write for our terms and prices

"falcon" Supplies, Queens, Foundation

Booklet, "Simplified Beekeeping for Beginners" free

Write for catalog

W. T. FALCONER MFG. COMPANY, Falconer, (NEAR JAMESTOWN) N. Y., U. S. A.

"Where the BEST Beehives come from"

QUEENS

PACKAGE BEES NUCLEI

QUEENS

FOR YEARS WE HAVE BEEN SHIPPING THOUSANDS OF POUNDS OF BEES ALL OVER THE U. S. A. AND CANADA

Now is the time to place your order for spring.

Send for our 1923 Circular, it's free.

We can save you money by ordering early.

The very best of Bees and Queens.

ITALIANS CARNIOLANS GOLDENS

NUECES COUNTY APIARIES, CALALLEN, TEXAS

1923 PACKAGE BEES AND QUEENS FOR SALE

3 BANDED AND GOLDEN ITALIANS

We are booking orders for spring delivery. We can sell bees as cheap, but not cheap bees. Our Geo. B. Howe-Root-Davis strain of bees have always given satisfaction. They are the very best honey-gatherers obtainable. If any bees should die in transit we will replace them cheerfully. We wish to state that our bees' origin on Roots side is the FAMOUS $200, crossed with Howe-Davis strain of bees, which are wonderful bees. No disease. Write for prices.

References: G. A. Foster, President of The Bank of Liberty, Liberty, N. Car.; J. A. Johnson, Vice President.

H. B. MURRAY, Liberty, N. C.

"The Lumber That Lasts" **FOR** **Bee Hives Hive Bottoms Hive Stands**

The only lumber that a well informed bee keeper will consider is genuine "ALL-HEART"

"OF COURSE" "TIDE WATER" CYPRESS "THE WOOD ETERNAL" "OF COURSE"

"Because, why?"—

Because he has learned by experience that "All-Heart" Cypress resists rot to such a remarkable degree in all cases where extremes of weather conditions—hot or cold, wet or dry—have to be met and overcome, that it is "the only."

Write our All 'Round Helps Department, for reliable counsel on the solution of any lumber problem that's on your mind. Address

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION
1251 Poydras Building, New Orleans, La., or 1251 Graham Building, Jacksonville, Fla.

Insist on "Tide Water" Cypress—you can identify it by this mark:

YOUR LOCAL DEALER WILL SUPPLY YOU. IF HE HASN'T ENOUGH CYPRESS LET US KNOW AT ONCE.

CORRUGATED COMB HONEY SHIPPING CASES

Mr. J. E. Crane's article, in a recent number of American Bee Journal, on his success in shipping honey in corrugated shipping cases, has aroused so much interest that we have ordered a stock of these cases for interested customers. These cases are single tier, 24-lb., and made for the regular 4¼x1⅞ size sections only.

The cases are made sufficiently large, so that cartons may be used for packing sections if desired. Cases are exceedingly strong and should stand freight or express shipment without difficulty. Packed in bundles of 10 cases. Price for 10 24-lb. cases corrugated, $2.50. Larger quantities at the same price.

(Mailing weight of 10 cases, 30 lbs.) Send us a trial order today.

DADANT & SONS, HAMILTON, ILLINOIS

MR. BEEKEEPER—

We have a large plant especially equipped to manufacture the supplies that you use. We guarantee all materials and workmanship. We ship anywhere. We allow early order discounts and make prompt shipments. *Write for free illustrated catalog today*

We pay highest cash and trade prices for beeswax

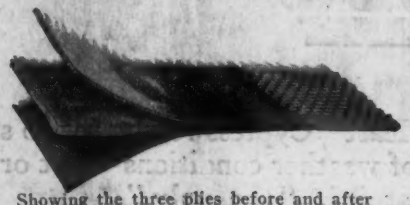
LEAHY MFG. CO., 90 Sixth Street, Higginsville, Missouri

J. W. ROUSE, Mexico, Missouri Texas Distributors, A. M. HUNT & SONS, Goldthwaite, Texas

ANOTHER LONG STEP FORWARD

Three-Ply AIRCO FOUNDATION

Once again we announce to the beekeepers of America a very long step forward in the manufacture of comb foundation. Three years ago we invented and brought out the new milling and new refining process of our now famous AIRCO Foundation. That was a big advance over any other foundation then made. Today we announce an entirely new thing in comb foundation, namely, Three-ply AIRCO, our latest and best discovery in comb making. It is the result of years of research and experiment in seeking a non-sagging comb foundation.



Showing the three plies before and after milling.

As its name implies, and as the accompanying illustration shows, this new product is made of three plies and THE STRENGTH IS PUT INTO THE COMB ITSELF. The center ply is pure beeswax, toughened by a small percentage of pure vegetable wax. The two outer plies are made of the purest, softest beeswax that can be found. As these two outer plies form the surface of the midrib and the entire cell walls, the bees accept this new comb foundation just as readily as they do the regular single-ply AIRCO.

In both the laboratory and the apiary, we have proved by the most exhaustive tests that this new comb foundation has more than twice the tensile strength or toughness of any other comb foundation we have ever made. In the apiary, whether in favorable or unfavorable conditions, we have not found a single defect in it, although we have tried very hard to do so.

The Strength is in the Comb

Three-ply AIRCO Foundation has its STRENGTH IN THE COMB itself, and the comb is so tough that we have succeeded in getting excellent combs built from it without any wiring whatever. But we do not advise giving up the use of four horizontal wires with this or any other comb, for the demonstrated fact is that horizontal wiring gives back to the beekeeper, with big profit, his cost of labor by assuring the straightest and evenest of all combs with the fewest possible irregular cells. Horizontal wiring also holds the comb in the frame most securely of all wiring and the comb horizontally wired is the least gnawed by the bees, whatever the conditions of the honey flow. On account of the tougher, harder center of Three-ply AIRCO, imbedding of the wires in it is much easier and faster than in any other foundation.

Wax rendered from combs built of Thre-ply AIRCO comb foundation is slightly harder than ordinary wax, but for commercial and industrial purposes it is superior and should command the same market price. However, at any time it may be necessary to melt Three-ply AIRCO combs, because of disease, we will pay the full market price for the wax; and, if Three-ply AIRCO is not all we claim, we will refund your money.

Our Claims for the Three-Ply Airco Comb Foundation

1. More than double strength.
2. Stretching practically nothing.
3. No melting down in hot weather.
4. Straight combs.
5. No gnawing around wires.
6. Greatest number of worker brood cells.
7. Seven sheets to a pound average.
8. Accepted like single-ply AIRCO.

Three-ply AIRCO Foundation averages seven sheets to the pound for standard Hoffman frames. Its especial use is for the brood chamber, but it also gives great additional strength to extracting combs.

Furnished only in sheets 8x16¾ inches, for Hoffman frames (about seven sheets to the pound) and size 10x16¾ inches for Jumbo frames (about five sheets to the pound). There is no necessity for the Three-ply AIRCO in comb-honey supers. The price for medium brood, Hoffman or Jumbo frames, is 85c in one-pound boxes; 82c in two-pound boxes, and 80c in five-pound boxes.

Send for our handsome new 1923 CATALOG and learn more about this wonderful new foundation and other best things in bee supplies of all kinds.

THE A. I. ROOT COMPANY

West Side Station

MEDINA, OHIO

A sheet of Three-ply AIRCO (between clamps) holds up a 68-pound boy.